FLYING

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DETROIT

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Get all the facts at any U. S. Army and U. S. Air Force Recruiting Station. Or, write to Headquarters, U. S. Air Force, Attention: Aviation Cadet Section, Washington 25, D. C.

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Why globe trotters wear rubber boots

THE FIRST plane to fly 'round-the-world on scheduled airline service was the "Clipper America", shown above. On that pioneer trip, this plane wore B. F. Goodrich De-Icer boots to protect it against icing conditions.

Today, all globe-trotting scheduled airliners are equipped with De-Icers for safer, more dependable flights.

De-Icers fit snugly on the leading edges of wings and empennage, where most ice forms. Inside the De-Icer, a series of air-driven tubes inflates and deflates, flexing the rubber. This cracks and frees any ice that has formed on the leading edges, and the air stream carries it away.

This simple system has proved so safe and efficient that today practically every airliner requiring ice protection is equipped with B. F. Goodrich De-Icers. Many twin-engine private planes also use De-Icers to cut delays, increase availability and provide added safety.

De-Icers are light weight and take up little space for their plumbing. They are operated safely—by cool air under low pressure. They are easily maintained and low in cost. Tailor-made De-Icers can be quickly installed on planes that have built-in plumbing. And complete De-Icer systems, including the latest improvements, can be designed for new models.

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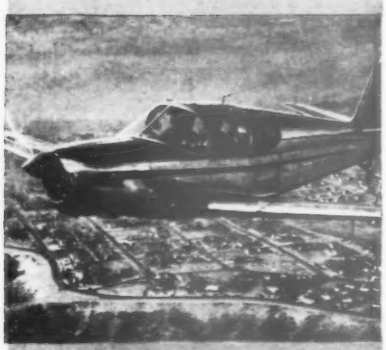

THE COVER: Temco Swift 125 in flight over El Paso, Tex. Photo by Ulric Meisel.

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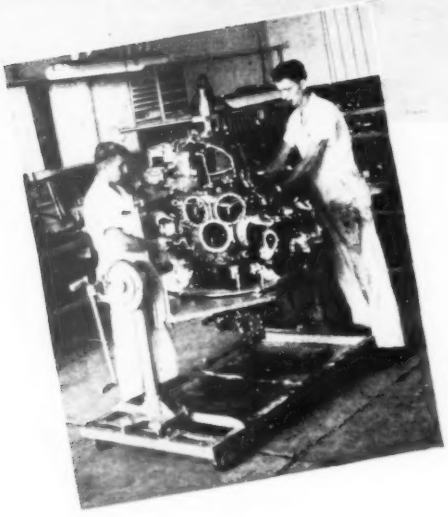

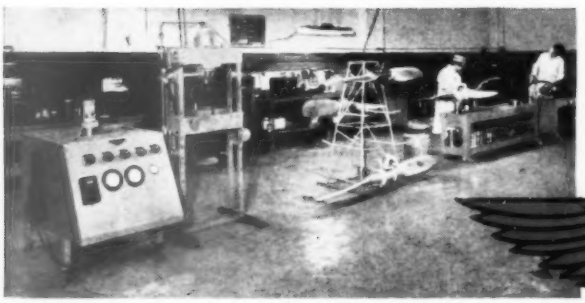

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The Safe Flight Indicator is now standard on all 1948 Stinsons. This progressive step is further proof of Stinson's constant effort to make flying even safer.

Stinson's choice of the SFI was only natural because the SFI is the only stall warning indicator on the market which gives positive warning under all conditions. The SFI is also being extensively used:

- On the Model 240 Convairliner as standard equipment.
- On more than 3000 aircraft of all types.
- On many experimental military aircraft including jet fighters and bombers.

The SFI provides for the first time accurate stall instrumentation and complete protection against inadvertant stalls and spins. For airport operators the SFI gives added protection, helps train students better. For the aircraft owner, the SFI permits lower insurance rates, guards against the cause of most fatal accidents. It is called a "safety must" by AOPA.

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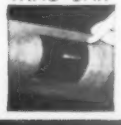

PANEL UNIT

SAFE FLIGHT INSTRUMENT CORP.
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New York

THE MAIL BOX

SLIP-HAPPY

You're SLIPPING! The cover of the March issue of FLYING shows a Piper *Cub* in flight. Under the small reproduction on page four, you state the aircraft is banking. (See photo below.)

Out here on the Pacific Coast we call that attitude [right bank, left rudder] a SLIP.

Maybe things are done differently on the Atlantic Coast.

HENRY S. GUICHARD

Ellensburg, Wash.

. . . in Texas, you *slip* when you cross controls.

R. D. PATRICK, JR.

Liberty, Tex.

Looks like a slip or cross-controlled turn to me.

GLENN A. SNELL

U. S. S. Piper (SS 409)
Portsmouth Naval Shipyard

Do they fly planes there the same way they do in Oklahoma?

GLENN A. BISHOP

Beaver, Oklahoma.

How can such a swell magazine get so fouled up at times? . . .

RAYMOND W. HEEMSTRA

Holland, Mich.

. . . Am I right or do my eyes deceive me?

CHARLES L. WINGE

Baltimore, Md.

. . . The ailerons are in the correct position, assuming the *Cub* is just entering the bank. But the rudder . . .?

K. S. EVERSULL

Midland, Tex.

● To these, and 18 other ferret-eyed readers: Okay, boys, the plane was slipping. But FLYING wasn't. Or maybe you know how to get into a slip *without* banking.—Ed.

CROSS-COUNTRY GUIDE

What's happened to the Cross-Country Guide [January FLYING]?

ROBERT T. MITCHELL

Butte, Mont.

● After a delay in press date, caused by difficulty in financing, the National Aero Service is now publishing the Guide, which lists recommended airports for cross-country flyers.—Ed.

STALL WARNING INDICATORS

I think the compulsory installation of stall warning indicators on airplanes would be downright profiteering. The use of these devices would tend to make the pilot just one step closer to being a mechanical robot.

At $47 each (the present price) it would cost $4,414,240 to equip the 93,920 planes in use now. Then there would be a cost of about $563,520 for labor at $3 per hour and two hours per airplane making a total cost of $4,977,760 just to install the things. This would not include cost of upkeep, etc.

I have found that the installation of more instruments, gadgets, lights, horns and other safety devices only tends to confuse and befuddle the pilot and especially the student who should be learning the feel of the plane rather than the sound of a horn or the color of a light. Pilots flew without these devices for many years and many are still living to die of old age or a deadly stall in a stall-proof plane.

I have flown crop dusting planes that were equipped with an oil pressure gauge, oil temperature gauge and tachometer—that was all—no airspeed indicator, altimeter or the vital stall warning indicator. Dusting pilots fly about three to five feet high and as slow as possible without getting into a deadly stall. In the past four years I have checked out in 32 different types of planes (none had stall warning devices) and I haven't found one that didn't give ample warning of an oncoming stall.

During the past year or so these gadgets have been foisted on the public so that the average, non-flyer thinks a stall is as deadly as the loss of both wings, no parachute and the plane on fire. If such opinions help private flying and attract new pilots, I have been wrong all my life.

Stinnett, Tex. JIMMIE FOREMAN

● Apparently Reader Foreman hasn't been paying much attention to accident reports. —Ed.

WANTS MODEL OF B-26

While returning from overseas after a tour of duty on the B-26, some so-and-so opened my duffle bag and swiped most of my souvenirs plus a pair of binocs and my most prized possession—a miniature aluminum scale model B-26. Does anyone know where a replacement could be secured or where B-26 aircraft recognition models could be purchased?

JIM ROBERTS

Littlefield, Tex.

● Bronzart Metals Co., 220 Fifth Ave., New York City, make aircraft models.—Ed.

(Continued on page 83)

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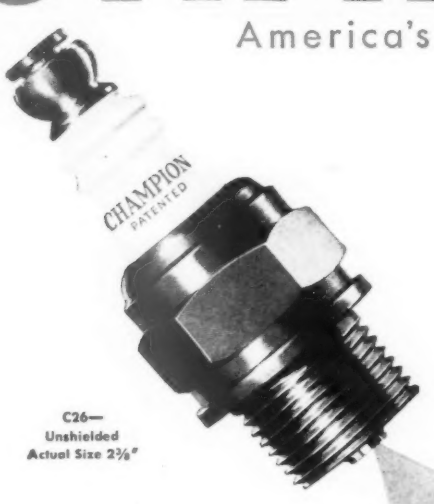

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. . . **A nine-day International Air Exposition** will officially open New York's international airport, Idlewild, July 31. It also marks the golden anniversary of Greater New York. All phases of aviation progress will be represented—accomplishments of the armed forces, air transport, air research and its relation to national security, helicopters, personal planes, air cargo and communications.

. . . **Jet engines** capable of 1,400 m. p. h. speeds will be possible if development continues at the pace maintained since America entered the jet race, Reinout P. Kroon, engineering manager of Westinghouse Aviation Gas Turbine, Philadelphia, recently predicted. Jet engine power has increased four-fold in the time usually needed to double a conventional engine's power. Barriers now standing in the way of practically unlimited flight speeds, Kroon said, are problems for the designers of airplanes, not the engine builders.

. . . **The 15th National Soaring Championships** will be back at Harris Hill in Elmira, N. Y., this year from June 30 through July 11. This will be the 14th time in the 15 years in which the soaring contests have been held that Elmira has been the host. The 1947 contest was held in Wichita Falls, Tex.

. . . **Cross-wind landing gear** by Goodyear (size 6.00 x 6), including single disc brake, have been priced at $190 each or $380 per set. These are list prices and do not include installation charges. Both Stinson and Cessna planes now can use this equipment.

. . . **Popularity of lightplanes** for use by business firms is increasing steadily, according to a survey conducted by the Personal Aircraft Council of the Aircraft Industries Association. In 73 per cent of the cases they are used by executives on general transportation flights. The least amount of use, 11 per cent, is for delivery and consumer service, often under emergency conditions. Other uses include regular territorial trips by buyers and salesmen to cover wide areas quickly and cheaply, sales promotion, trouble shooting, etc. Twenty per cent of the companies reported use of company planes had resulted in the purchase of private planes by their personnel.

. . . **Twelve per cent of U. S. airports**—705 of 5,000—have been rated "above average" or "superior" during the September-January rating period by the Aircraft Owners and Pilots Association. During the first survey period ended June 30, 1947, only 443 received such ratings.

. . . **Rebates** will be given by Northwest Airlines to all passengers on flights more than 30 minutes late. Each passenger on such a flight will receive a refund equal to five per cent of his total fare

. . . **The first U. S. supersonic jet fighter** may be flying in 1949, the National Advisory Committee for Aeronautics hopes. A spokesman for the committee said the revolutionary fighter will travel faster than sound (760 m. p. h. under standard sea level conditions). A description of the plane has already been presented to the house appropriations subcommittee. Three new jet bombers are also under development which will have speeds exceeding 500 m. p. h.

. . . **Another radar warning device** has made its appearance now that collision-warning has become a "must" for all scheduled aircraft carrying passengers at night or under instrument flight rule conditions. The latest, developed by Pan American World Airways engineers, can be pre-set to flash the pilots a watch-out signal at any of five different altitudes—2,000, 1,000, 500, 400

Hughes radar device on Constellation.

and 300 feet. Besides flashing a warning, bright red figures across the face of the instrument tell the pilot his exact altitude at each particular moment. The 25-pound set has been installed in all Pan American Clippers. It differs from the 16-pound unit introduced by Howard Hughes last summer which has three warning ranges of 500, 1,000 and 2,000 feet. The Hughes device warns the pilot by a brilliant red light and a warning horn when the airplane comes too close to obstacles.

Hughes has produced about 800 of the units at his aircraft plant and has supplied the sets at cost to several airlines. END

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CAPTURED GERMAN ALL-WING GLIDER

"The nearest thing to a bird ever flown" is the apt description of this all-wing glider voiced by aeronautical experts.

The strange craft, called the Horten VI, was built in 1944 by two German youths, Walther and Riemer Horten. It was one of the Nazi attempts to adapt U. S. flying-wing design for eventual military use.

The glider's knife-like wing has an aspect ratio of 32:1. The root chord is 3 feet, 4 inches. Span is 78 feet, and weight about 750 pounds. A shallow cockpit forces the pilot to lie prone, with his head under a small plastic bubble.

Credited by some experts with setting a world's altitude record of 39,000 feet, the glider will be flown again after rebuilding by students at Northrop Aeronautical Institute, Hawthorne, Calif.

Being Analyzed by Students in Engineering and Mechanics Classes at Northrop

The picturesque craft shown at the left was captured in Germany during the war, sent to Wright Field, and more recently turned over to Northrop Aircraft, Inc., Hawthorne, Calif. Now it is a subject of study in the Aeronautical Institute division of the aircraft company. Engineering and mechanics students are studying and evaluating the glider's construction and aerodynamic characteristics. Data from the studies will be used in designing and building an all-wing glider as a student project.

This is typical of the practical and interesting assignments in Northrop training. Another project, a student-designed and built twin-boom pusher type monoplane, is fast approaching the flight test stage. Many other day-to-day shop and laboratory assignments are provided by wind-tunnel models, mockups, and experimental aircraft–all transferred to the Institute from the Northrop research and development laboratories. Both engineering and mechanic students enjoy the extraordinary privilege of contact, in this way, with latest developments in design and construction.

The technical institute conducted by Northrop, famous as builders of the spectacular Flying Wings, is located in the midst of the company's busy center of aircraft research, development, and manufacturing. The students were among the first to see the great 8-jet Flying Wing and viewed its first take-off from the mile-long Northrop Field runway at the Institute's "back door."

The Northrop school is one of the few technical institutes offering an aeronautical engineering curriculum approved by the Engineers' Council for Professional Development. Its Aircraft and Engine Mechanics course is approved by the Civil Aeronautics Administration. Both types of training are open to both veterans and non-veterans. Classes start at frequent intervals. Graduates hold important positions with many leading aircraft and airline companies throughout the world, besides being employed in Northrop's own plants.

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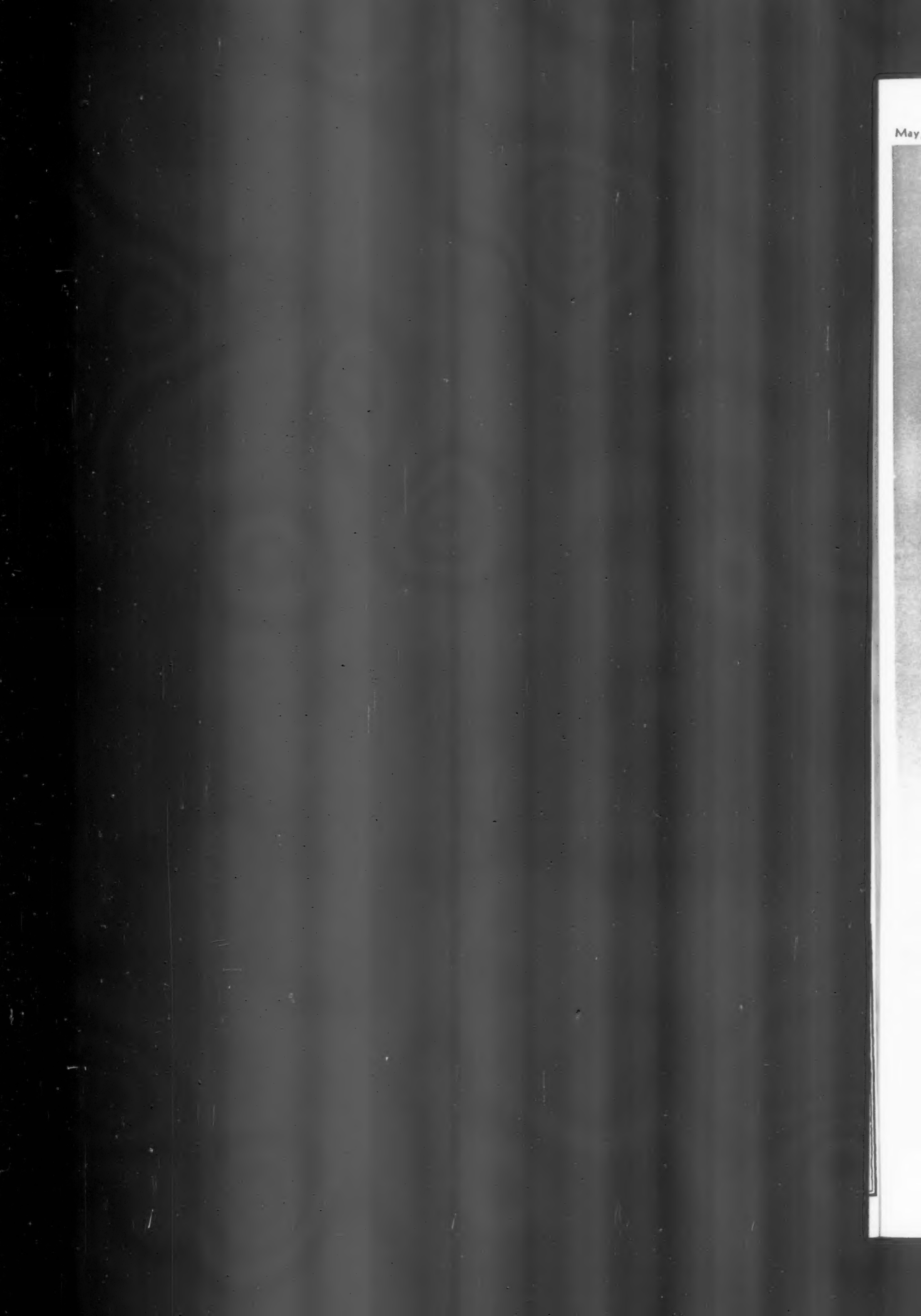

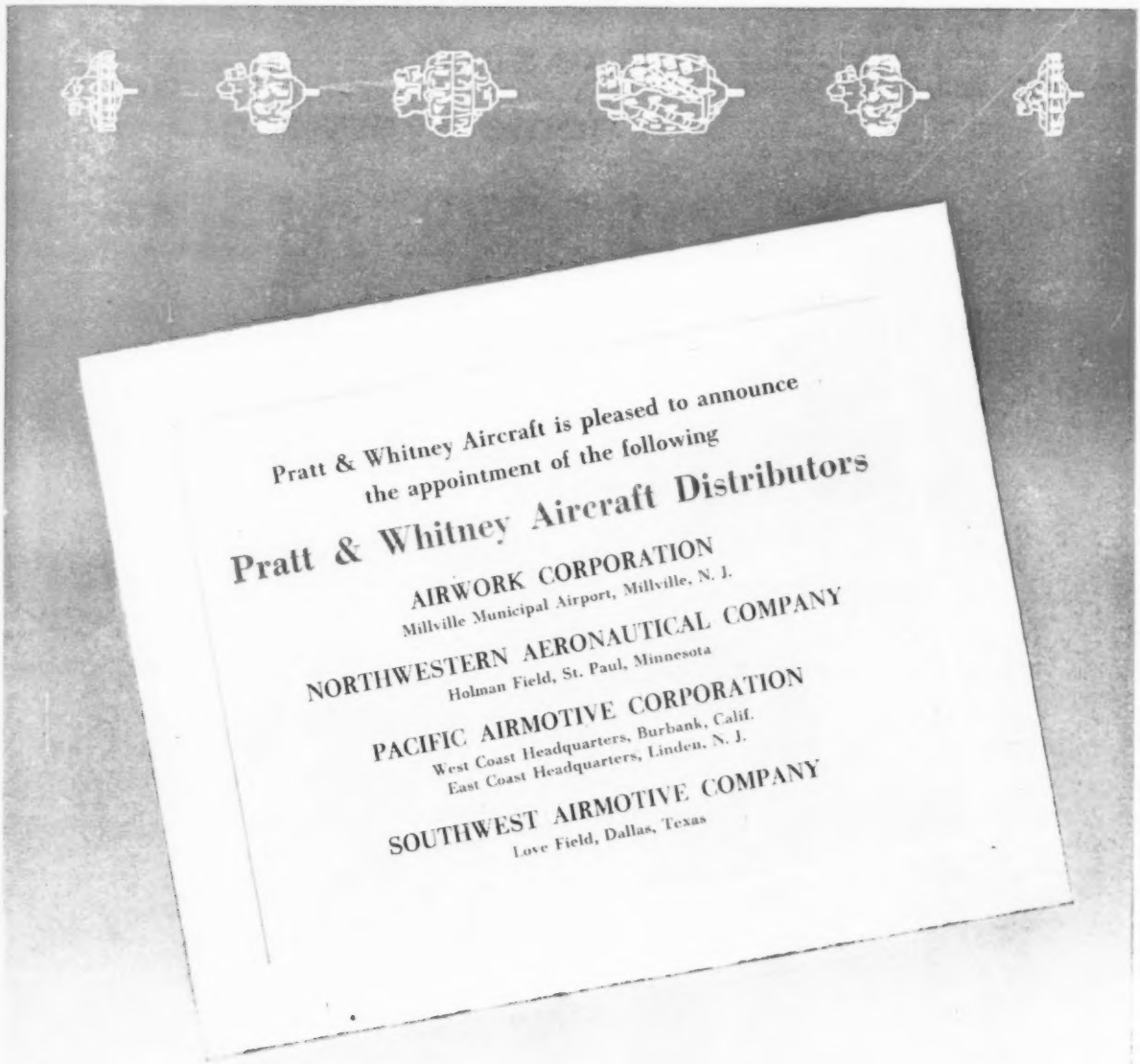

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President H. G. Zelle and his associates got tired of doing that, so the firm bought a Bonanza. "With it," he says, "we are no more than 2½ hours from our most distant office. Trips formerly requiring several days can be completed in comfort and without fatigue *in one day*."

Economy? Operating cost as low as 1¢ per passenger mile! Of a recent trip, Mr. Zelle says: "Fare by other means would be about $47 for myself and son. Fuel and oil cost by Bonanza—$6.80."

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FLYING
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1948

MANY REPORTS— LITTLE ACTION

WE are beginning to wonder just exactly how much fire needs to be built under the Congressional mule to get it to move.

On the heels of the dire warnings contained in the Finletter Report, the nation now has the report of the Congressional Aviation Policy Board. This latest investigative body once more substantiates the grim warnings of national weakness and danger so strongly voiced by its predecessor report.

Together, the findings of these qualified bodies loom up on the national security horizon like sixteen red barns on fire. No one in his good senses can possibly avoid the dire conclusions these investigations give rise to.

Yet the dallying, fumbling and temporizing in reference to our national defense establishment continues. The chaos in planning and responsibility which now exists, remains.

The Congressional Aviation Policy Report turns the spotlight again on our military backwardness, coupled with the "threatened bankruptcy of the aircraft industry and civil air carriers of the United States." It reminds the nation that "to defend ourselves in the age of atomic bombs, of radioactive dust, of bacteriological contamination and guided missiles . . . we must have air power that is supreme."

The Report then notes, tongue in cheek, that if our present budget cannot fulfill the cost requirements of an adequate airborne defense establishment, we must either increase income taxes or engage in debt financing. Since neither course is desirable or perhaps feasible, the Report comments: *"The only alternative is a reduction in other expenditures.*

FLYING has been saying this same thing for a long time.

Despite these self-evident facts, and the lateness of the hour, immediately after the issuance of the Congressional Aviation Policy Report's warning, the Senate of the United States has seen fit to appropriate a new and staggering sum of money for the greatly enlarged world WPA project known as the European Recovery Program. Presumably, the House, engaged by the same influences, will follow suit.

The President of the United States receives $75,000 a year, and seems to get along reasonably well on it. Nevertheless, the British Princess Elizabeth, among the royal coterie, is to get $200,000 a year out of the American taxpayer's money. The King of Greece gets half a million dollars year.

We have given three billion to Greece and one and a half billion to Italy, with more billions slated under Mr. Marshall's new "plan." Nevertheless, the Greek communist rebellion remains unchecked. The latest official reports to the President accuse King Paul's government of wasteful extravagance, corruption, and personal advantage to officials in regard to expenditures of these loan funds. The growth of communism in Italy has not stopped.

With all due respect to Mr. Marshall, we do not think his "plan" is worth much more than his previous "plan" in reference to China, where he demanded as his last act before withdrawing from that stricken country, that a reorganization be effected in the Chinese Government to take in the communists.

The duty of the United States now is to protect itself by whatever means possible. It cannot do so in the face of all this profligate spending on behalf of states ideologically hostile to us or sunk in anarchy, enervation and decrepitude.

Our own conviction is that anything less than an air establishment of supreme power, irrespective of cost, is a swindle *(Continued on page 82)*

AN EDITORIAL BY

William B. Ziff

Congressional Aviation

Broad reorganization plan urges 10-fold increase in combat plane procurement, a strengthening of the CAB and abolition of CAA.

AN ENORMOUS increase in military aviation expenditures is necessary to assure the safety of the United States. The security frontiers of all nations have disappeared with the atom bomb. Supreme air power is the only means of defense against sudden aggression.

. . . These are some of the conclusions of the Joint Congressional Aviation Policy Board which reported early in March.

"To defend ourselves in the age of atomic bombs, of radioactive dust, of bacteriological contamination and guided missiles—to mention some of the new and terrible weapons—we must have air power that is supreme. We cannot have less if we are to discourage attack or, if attacked, to defend ourselves," says the Board.

The Congressional Report outlines a detailed program for increasing the military air power of the United States. It proposes to spend between 14 billion dollars and 17 billion dollars for new planes in the next five years.

Combat Aviation

Lockheed Shooting Stars typify fast jet aircraft which would go into vastly increased production. The Air Force and Navy expect to spend only $400,000,000 for new planes in 1944. Under the Board's proposals this would be increased to an average of 3 billion to 4 billion dollars per year beginning in 1949. Supreme air power is the aim of these plans. "Until men of all nations can meet in good will in the council chambers of the world, anything less than this . . . supremacy in air power is self-deception."

Air Transport

Development of such giant air transports as the Convair XC-99 would be sponsored by the Federal Government. They would be intended primarily for commercial use but suitable for military purposes. All effort should be made to bring the airlines up to all-weather operations. More than a billion dollars should be spent on a program for installing ultra-modern navigation, landing, and airways traffic control facilities to obtain this objective. The aim is a strong civil air fleet for emergencies.

Policy Report . . .

In addition, it recommends a complete revision of the civil aviation setup of the Federal Government—*including abolition of the Civil Aeronautics Administration, strengthening of the Civil Aeronautics Board, and creation of several new civil aviation agencies.*

The report parallels the President's Air Policy Commission Report, and follows it by about six weeks. It agrees with the Commission report in most essentials, though differing from it in detail. It is enormously significant in that it represents the thinking of Congress and the apparent willingness of Congressmen to appropriate additional money for aviation.

The Congressional Board was headed by Sen. Owen Brewster, Me., chairman, and Rep. Carl Hinshaw, Calif., vice chairman. Four other Senators and four Representatives made up the board, with nine additional Congressmen serving as ex-officio members.

They made 92 specific recommendations for completely overhauling the military, transport, manufacturing, research and Governmental aviation setup of the nation.

All recommendations are aimed at strengthening the nation's air power. The primary problem of national aviation policy, the Board believes, is one of providing well-balanced military and naval air forces. If that is done, the aircraft industry can take care of itself.

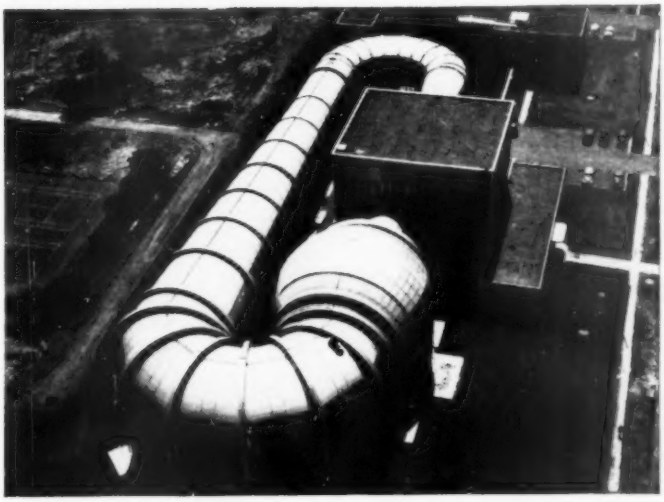
"National air power is an entity not fundamentally divisible as a weapon or as a carrier. Materials, organization, and craftsmanship which go to make a great aviation industry are as readily turned to the combat plane as to transport. Airway facilities which give scheduled dependability to civil airlines also give tactical dependability to military air forces. Airports which serve the burden of national and international traffic also can base tactical or strategic combat squadrons. Transport fleets which serve commerce in peace can tie together tactical and administra- *(Continued on page 44)*

Aircraft Manufacturing

Even such volume production as we have on Republic Thunderjets is almost a machine shop operation. The United States cannot afford to maintain in peacetime the Air Force required to win a war. The proposed aircraft procurement program, however, would provide manufacturers with facilities, experience and personnel to enable them to expand rapidly in case of emergency. New planes would be designed for producibility. Congress should authorize a succession of five-year programs reviewable yearly.

Research and Development

The NACA 12-foot pressure wind tunnel of the Ames Aeronautical Laboratory is only one link in a comprehensive research program. Research is the key to progress, and should always be given priority over development, to which it is now linked in the air service budgets. NACA and the Research and Development Board of the National Military Establishment should speed a unified plan for supersonic research. The latter should plan and guide an integrated program of better planes and missiles.



The Navy's New Training Plan

SNJ replaces obsolete Boeing Kaydet as the Navy primary trainer. Result: greater safety, better-trained pilots.

By JAMES M. STACY
Lieutenant, United States Navy

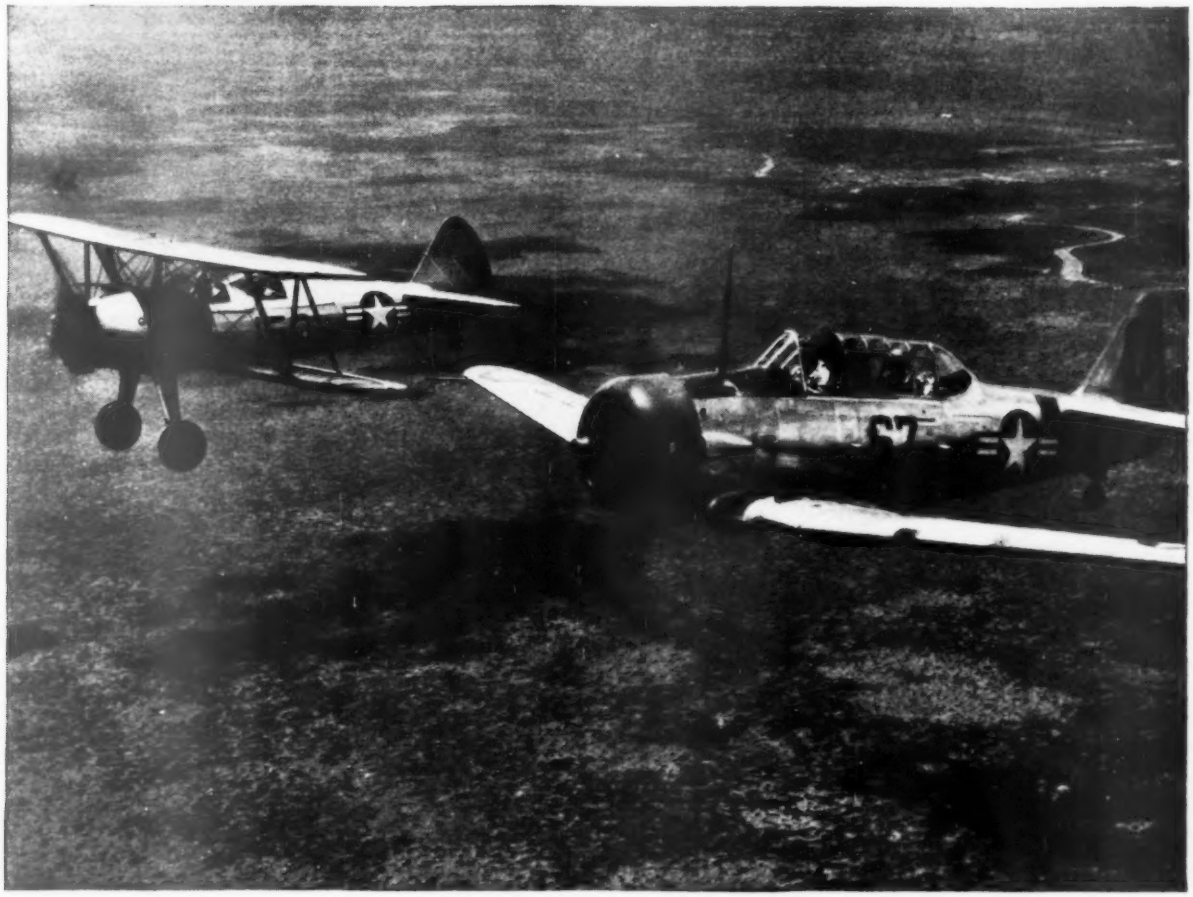
IT'S A FAIRLY SAFE assumption that, no matter how "scientific" we get in the flight training business, we'll never adopt Mother Bird's technique—pushing junior off the nest. But the thinking of the Navy definitely tends towards giving the embryo pilot a man-sized job as his first assignment.

Time was when learning to fly was a methodical progression from slow, stable biplanes with a minimum of gadgets on down the line of intermediate trainers, advanced trainers, to operational trainers and fleet types. In the course of instruction the cadet re-lived the history of the airplane—low powered engines, fixed pitch propellers, fabric-covered wings—add variable pitch props and manifold pressure gauges—add wing and cowl flaps—add a hydraulic system with retractable gear—add radio and other communications and navigation gear—*ad infinitum*.

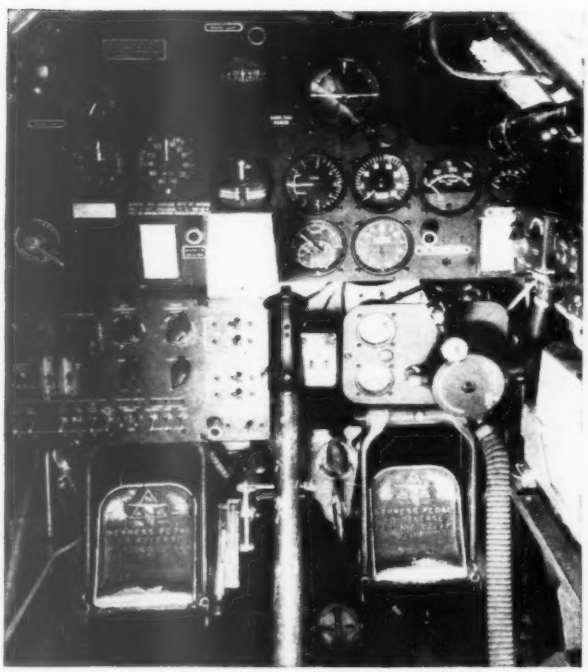
But today the boy who begins training for Navy wings gets different treatment. From the moment his flight training starts he is not just learning to fly. He is learning to fly a modern airplane, and that means with *all* the gadgets. His first ride as a student and his first solo will be in the SNJ (North American *Texan*) which started World War II as an advanced trainer.

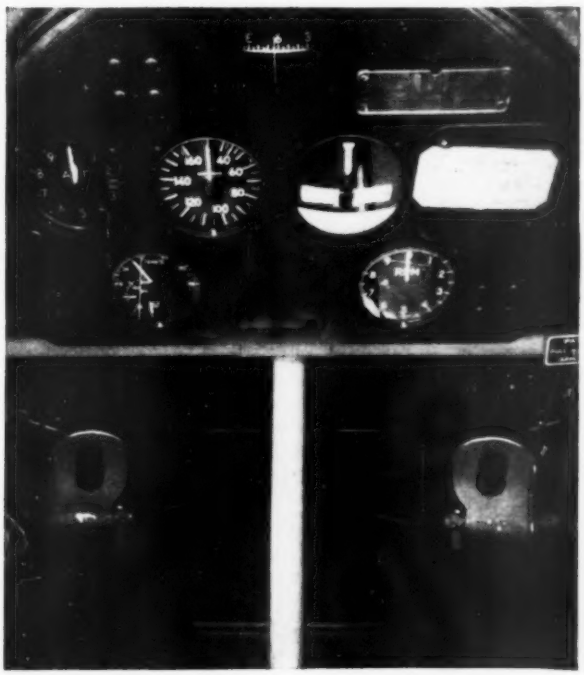
(Continued on page 79)

North American Texans (SNJ's) at Corpus Christi were used by Navy to test training plan. Quality of pilots was improved, money and time saved. Accident rate was less than half that of classes which flew planes like the Boeing Kaydet in older training curriculum.



Old and new in primary trainers. Light biplane is outmoded by the SNJ (Texan), which more nearly approaches Navy operational aircraft.





Instrument panels show contrast between 650-h.p. SNJ and 220-h.p. Kaydet, which is comparatively instrument-free. North American Texan has retractable landing gear, flaps, controllable-pitch propeller, radio, and is equipped for flight under instrument conditions.

Blackjacking the Pilot

"Sandbagging" letters and threats to call in Department of Justice intimidate accused CAR violators.

By CURTIS FULLER

Managing Editor of FLYING

LAST June 23, John W. Vos, of Beloit, Wis., took off from Milwaukee for St. Louis, Mo., in a Bellanca *Cruisair*. Although from almost any point of view Vos exercised good air judgment and careful safety precautions, the flight involved him in allegedly technical violations of the Civil Air Regulations which were months in being settled, which brought him "sandbagging" letters from the CAA with the threat of intervention by the Department of Justice, and which finally left a permanent black mark upon his pilot's record.

His case is all too similar to other alleged CAR violations which are jamming up the CAA and CAB. In an effort to clear up the glut of cases, the CAA has set up a kind of cafeteria court which accepts bargain-counter settlements and under which the offender is always considered guilty until he proves himself innocent—in direct contradiction to usual American justice.

When Vos took off from Milwaukee last year, the weather bureau there advised him to check St. Louis weather closer in to the city, since there was a possibility that St. Louis would be closed. Radio reception was so bad that Vos was unable to get weather reports en route, so he landed at Moline, Ill., about 200 air miles from St. Louis, to check the weather personally.

The weather bureau at Moline advised Vos that conditions were satisfactory for a CFR flight to St. Louis and that the forecast indicated even better conditions by the time he would arrive there. Vos took off from Moline and flew at 2,000 feet. Visibility was five miles or more at all times. The ceiling was ragged but even at 2,500 feet Vos estimated that visibility was over three miles.

Continuing poor radio reception made it impossible for Vos to receive en route weather reports. He stayed well to the west of a straight line course, as advised by the Moline weather bureau, and headed for Lakeside Airport to the south of St. Louis. Over St. Charles, Vos descended to 1,500 feet for better visibility and could see Lambert Field, the St. Louis Municipal Airport, approximately six miles away. He continued south and started around the south end of St. Louis toward the east, but found the haze was thicker close to the Mississippi River and visibility was only about two miles. He therefore turned back and decided to land at Lambert Field, though it was many miles from his destination, Collinsville, where he had intended to spend the night.

(Continued on page 56)

Mooney's Mite

In flight, Mooney M-18 looks like much larger and more powerful aircraft. Designer hopes flying school operators, farmers will want plane.

Tail section (top) can be adjusted in 7° arc, eliminating need for trim tabs. Ruler shows extent of variation. Pilot points to tail control (bottom).

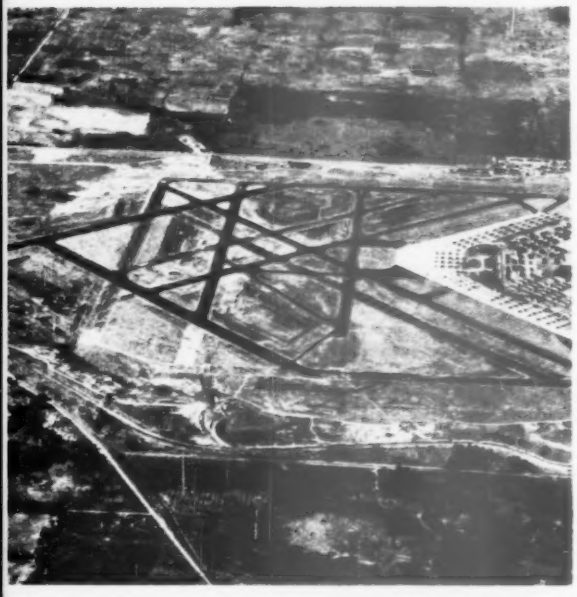
ACROSS the continent for $8 worth of gas in a plane costing less than $1,500. Sounds fantastic, but Al Mooney of Wichita, Kan., has flown an experimental single-seater (M-18) he believes will meet those specifications. Powered by a 26-h.p. Crosley automobile engine, the craft has a 16,000-foot ceiling and consumes only 1¾ gallons of gas per hour at cruising speed (90 m.p.h.). Top speed is reported over 100 m.p.h. Plane lands in low thirties, has rugged tricycle gear. Wing span is 27 feet, length 18 feet. Reduction gear run by four Goodyear steel cable belts brings engine's 3,900 r.p.m. down to 1,950 r.p.m. for prop. Weight: 450 lbs. empty, 700 loaded. END

Crosley engine has dual ignition, weighs 59 pounds bare, 103 with accessories. Four Goodyear belts drive propeller.

Refueling is simple. Test pilot Bill Taylor empties can of gas into eight-gallon fuselage tank. The plane has been flown in winds as high as 45 m.p.h.

Longest runway is Muroc, Calif., A.F. base's seven-mile strip. Four- and five-mile markers at bottom of photo indicate landing strip. Field covers 15,000 acres, tops for U.S.

Our Unusual Airports



Eleven paved runways are located at Turner A.F.B., Albany, Ga. This base contains over 60,000 lineal feet of pavement.

Nation's fields come in all sizes from 1.4 acres to a giant 15,000.

By JOSEPH BARRY

THE OTHER DAY I lost a $10 bet when I insisted that Cleveland Airport was the world's largest and that Pinecastle Army Air Field's 10,000-foot runways were the longest.

The Airman's Guide disproved my point—and, incidentally, led me into more research. The Guide, with CAA records to help, furnishes some interesting sidelights on the American Airport.

Out at the Air Force's Muroc flight test base in California, for instance, there's a 15,000-acre field with at least one runway that is over seven miles long. That's wide open space in the raw; Idlewild, New York City's replacement for La Guardia, will have a diminutive 4,900 acres by comparison.

But when the boys with the rulers start talking about runways, they always get around to Kirtland Field at Albuquerque, N. M. Its 10,170-foot east/west runway is the longest *paved* runway in the world.

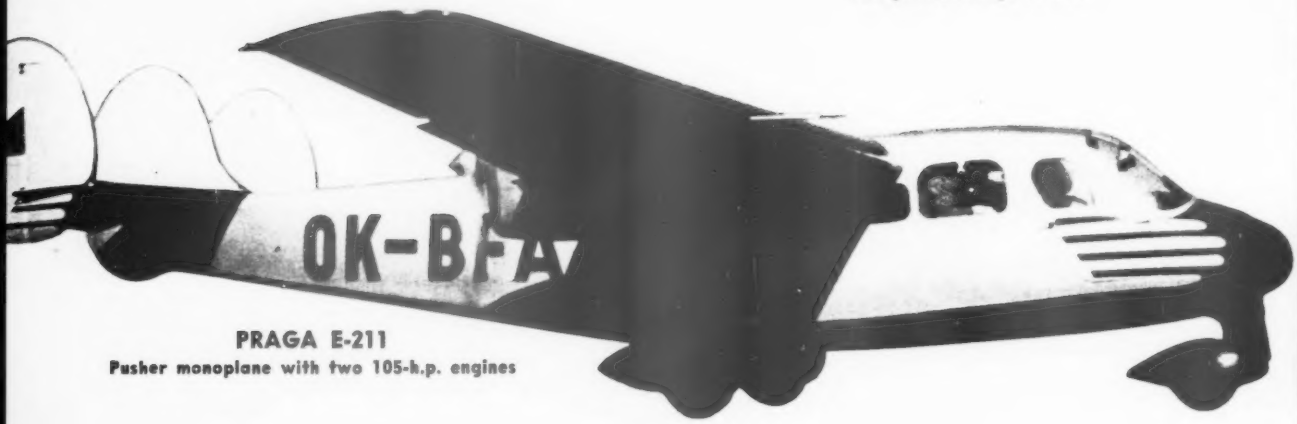
The lowest airports in the U. S. are in California, where two fields (Port Mecca at Mecca and (*Continued on page* 77)

Puny by comparison with huge Air Force bases, New York's Idlewild will have 4,900 acres, seven paved runways and will cost $150,000,000

A 10,000-foot runway (right) looks interminable from 3,000-foot-high vantage point. Pinecastle, Fla., A.F.B. 10,000-footer is one of 10 in U.S.

Country's lowest airports are at Mecca (below) and Calipatria, Calif. Both are 180 feet below sea level. Highest airport is at Fairplay, Colo.

PRAGA E-114
Two-place, 65-h.p. trainer



PRAGA E-211
Pusher monoplane with two 105-h.p. engines

Eight Czechs

PERSONAL PLANES are back on the market in Czechoslovakia. Production lines aren't rolling to capacity, but the central European aircraft industry has bounced back into the aviation picture.

The eight planes on these pages are among the first post-war models, with others contemplated by the government-owned Czech industry.

Among new designs, probably most interesting to Americans is the Hodek HK-101, powered with two 105-h.p. engines, which cruises at 187 m.p.h. and has a ceiling of 24,300 feet. The HK-101 is pioneering the same field as such U. S. manufacturers as Erco, who are working on low horsepower twin-engine models. The Hodek concern, incidentally, is the only Czech manufacturer not owned by the Government.

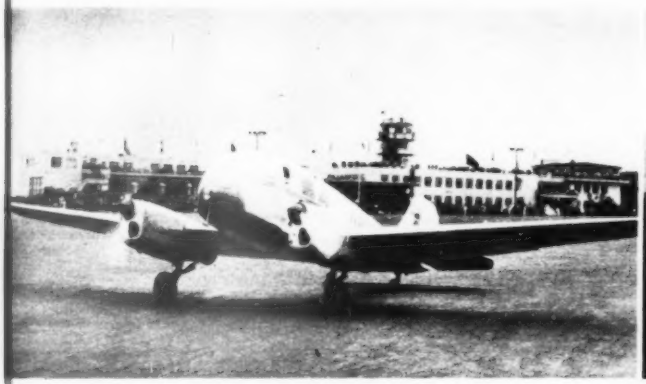
These planes may help to reintroduce the private plane to Europe's flyers, long familiar only with military and transport aircraft. END

EIGHT CZECH PERSONAL PLANES

MAKE AND MODEL	DIMENSIONS			POWER PLANT		WEIGHTS (lbs.)		SPEEDS (m.p.h.)				CEILING (feet)
	Span	Length	Height	Engine	B.H.P. at Sea Level	Empty Weight	Gross Weight	Max.	Cruising	Stalling and Landing	Range at Cruising Speed (Mi.)	
SOKOL M-1-C	32 ft. 9.6 in.	24 ft. 1.2 in.	6 ft. 4.8 in.	1 Walter Minor	105	904	1,698	150	132	38.7	625	16,400
ZLIN 22	34 ft. 9.36 in.	24 ft. 3.36 in.	6 ft. 5.16 in.	1 Zlin Persy 3	62	815	1,322	118	100	34.5	440	13,800
ZLIN 122	34 ft. 9.36 in.	24 ft. 3.36 in.	6 ft. 5.16 in.	1 Zlin Toma 4	106	1,014	1,764	134	118	40	620	14,400
ZLIN 281 (Aerobatic Trainer	34 ft. 9.12 in.	25 ft. 8.88 in.	6 ft. 8.64 in.	1 Zlin Toma 4	106	1,047	1,675	125	112	37-44	560	15,100
HODEK HK-101	25 ft. 3 in.	19 ft. 4.56 in.	6 ft. 4.68 in.	2 Walter Minor	105	1,102	1,763-1,818	219	187	59	550-625	24,300
AERO 45	40 ft. 4.2 in.	24 ft. 7.2 in.	7 ft. 6.48 in.	2 Walter Minor	105	1,808	2,932-3,088	180	155	47	625	15,400
PRAGA E-114	36 ft. .86 in.	23 ft. 4.2 in.	8 ft. 6.48 in.	1 Walter Mikron	65	749	1,212	116	102	40.5	405	13,500
PRAGA E-211	41 ft. .12 in.	27 ft. 7.44 in.	7 ft. 7.44 in.	2 Walter Minor	105	1,984	2,932	150	130	53	355-410	14,800

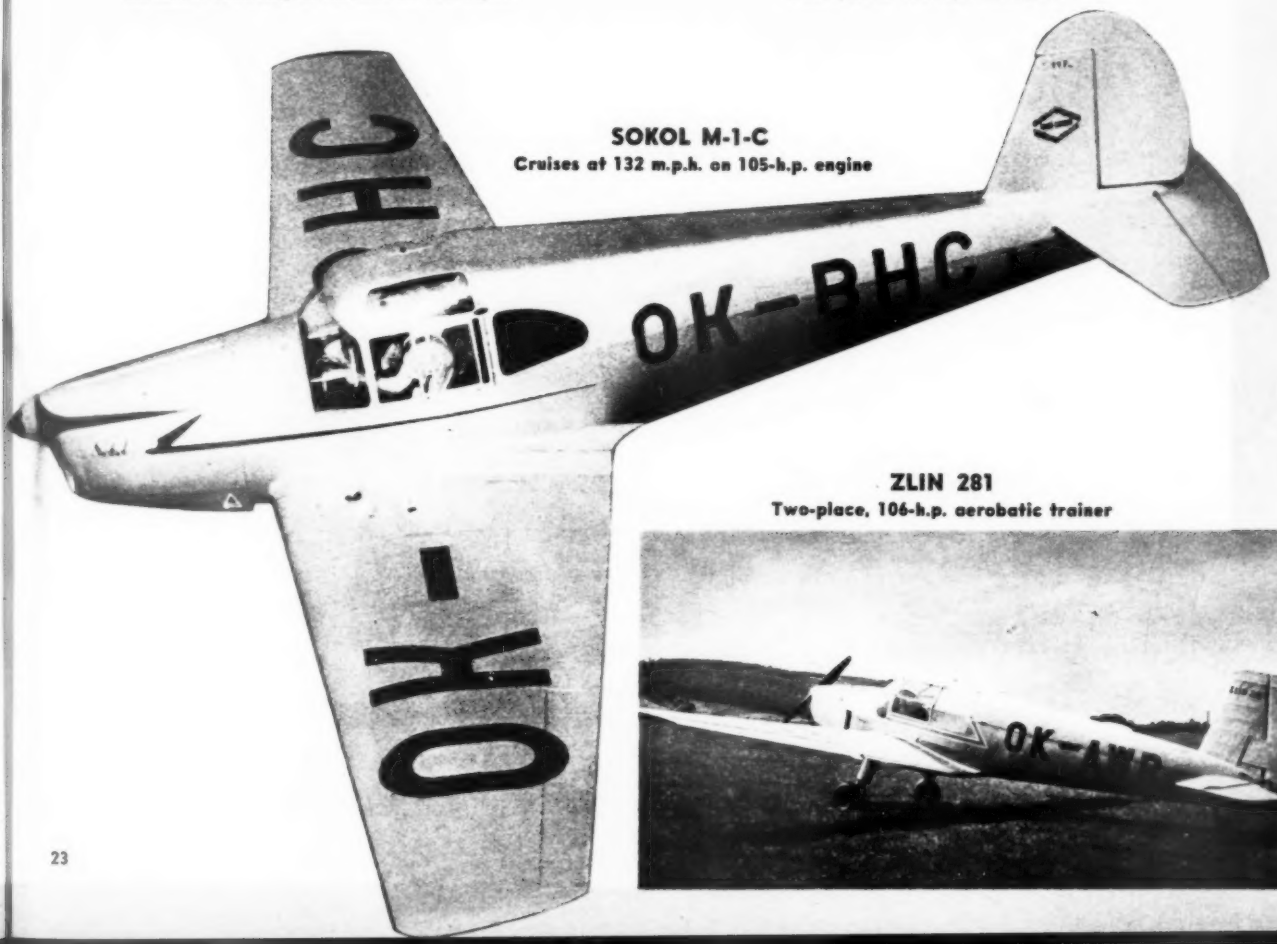
HODEK HK-101
Fastest Czech twin-engine personal plane

ZLIN 22
Two-place 62-h.p. personal plane



AERO 45
All-metal twin-engine, cruises at 155 m.p.h.

ZLIN 122
Four-place, 106-h.p. monoplane



SOKOL M-1-C
Cruises at 132 m.p.h. on 105-h.p. engine

ZLIN 281
Two-place, 106-h.p. aerobatic trainer

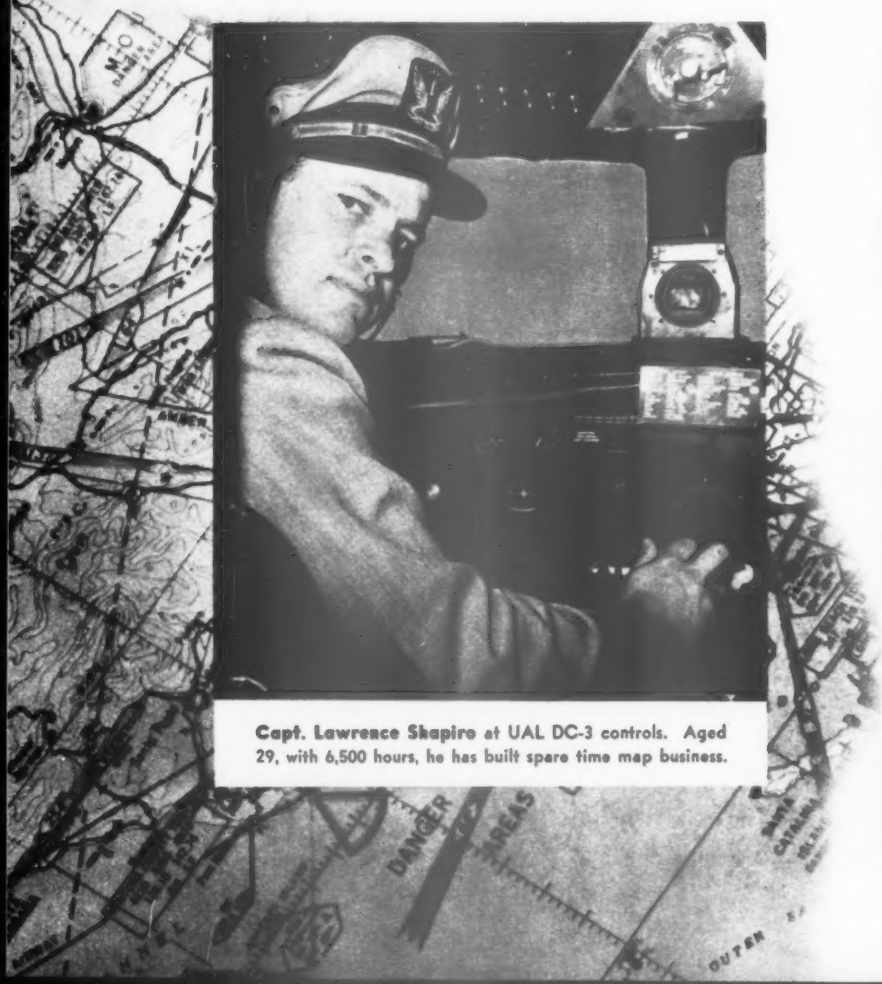
Maps are His Business

By RALPH YAMBERT

WHEN LARRY SHAPIRO was flying the San Francisco–Denver run as a co-pilot for United Air Lines in 1942 he was bothered by the problem of bulky maps.

Like Mark Twain's observation on the weather, most pilots talked about the map problem but no one seemed to do anything about it. So Larry did the job himself. In 1945 he developed the Rolaire map case, established his own manufacturing company, and set about the task of bringing order to the harried lives of cross-country travelers.

Today 29-year-old Shapiro's Rolaire map cases are used by such varied flyers as Paul Mantz—who allows as how the Rolaire had something to do with keeping him on course when he twice won the Bendix Air Race—and Dick Powell, a relative newcomer in flying, who considers the Rolaire an essential part of his *Navion*. Nearly 3,000 Rolaires have gone to all parts of this country and some parts of Europe. Several score airline pilots use them. Larry is up to his neck in manufacturing (*Continued on page 78*)



Capt. Lawrence Shapiro at UAL DC-3 controls. Aged 29, with 6,500 hours, he has built spare time map business.

Tailor's power cutter slices aerial maps into strips required by Rolaire map case.

Strips sliced by cutter are cemented together end to end by strong plastic tape.

Long strip maps are attached to two rollers, rolled up, and inserted in map case.

Completed map case is handy and compact, provides any given route on its rolls.

Plane-to-truck delivery is speeded after Cessna lands near a farm. Chicks, fresh from incubator, make trip in germicide-treated boxes.

Planes carry chicks safely from hatcheries to henhouse.

POULTRY AIRLINE

By ROBERT SCHICK

RAYMOND J. ELLIS of Fayetteville, Ark., is president of an airline that flies over 7,000 passengers in each plane. His outfit, South Central Air Transport of Fayetteville, hauls baby chicks from hatcheries to the extensive broiler-raising territory in northern Arkansas. Though operations were curtailed because of a market let-down during the winter, the chick transports will be doing business again this spring.

Formerly, the young chicks were expressed to destinations with resultant high losses from colds, bronchial troubles, poor care and contamination by other chickens. SCAT'S two Cessna T-50's (Noorduyns will go into service this spring) can now carry loads from Illinois and Indiana hatcheries to Arkansas farmers within a few hours. Losses are negligible because of speedy deliveries and germicide-treated cabins and containers. END.

Flying chicks arrive at henhouse a few hours after the T-50 left hatchery. One Arkansas feed house reports only five chick deaths in receipts of 225,000.

DESERT FLYING IS TOUGH

Before you cross the burning deserts, heed this advice from the pilots who know how to fly them.

Cessna 120 flies over desert. Handling lightplanes over such terrain requires special knowledge of air conditions, author says.

By EDWARD CHURCHILL

THE flight started one sunny Saturday morning from Los Angeles with the pilot, Eugene Timpe, 22, and his passenger, Robert Birnie, 21, setting their course for the resort-ranch section of southern Utah, about 400 airline miles away. They were flying a Boeing PT-17.

The first notice that Sheriff Glen Jones of Las Vegas, Nev., had that all was not well was a teletype from Sheriff Eugene Biscailuz of Los Angeles County, stating that Timpe and his passenger were long overdue at destination and asking that a check of airports in Clark County be made to see if the plane had gassed there. This was done, with no result.

Then, at about 7 p.m. Monday, a rancher drove into Alamo airport, five miles south of Las Vegas with a passenger who had two black eyes, a swollen face and was suffering from exhaustion.

"I'm Robert Birnie," the injured man said. "My pilot crashed somewhere out there against a mountain. (Birnie pointed in the general direction of where he thought the plane was.) We crashed shortly after noon Saturday. I walked about 40 miles and finally wandered into Sandy Valley.

"I think Timpe is still at the plane. His eyes were swollen almost shut and he'd hurt his ankle. He was in bad condition when I left."

Before he was taken to the hospital he told a harrowing story. After the crash he had been dazed and apparently had slept or was unconscious at intervals during the afternoon and night. The next morning rain was falling. He tore linen off the plane, made a catch basin and drank it. He found Timpe unconscious. He took the rear vision mirror off the plane and put it in Timpe's pocket. He had no pencil or paper with which to write a note to tell the pilot to stay by the plane. Then he staggered down the mountainside. He found a turtle, killed it and ate its heart and liver, kept looking for habitation. He finally stumbled onto the rancher.

It was not yet dark so George Crockett, manager of the airport, took off and tried to find the crashed plane. He couldn't and returned to the field. At dawn Tuesday

morning he took off again, and at the same time a posse under Undersheriff Cyril Stewart set out. Stewart had a radio car, a weapons carrier, a trailer, two horses and four men. A complicated radio system was used, with Crockett using his plane radio to the CAA tower at McCarran field, CAA calling the sheriff's office by telephone and the sheriff's station KNER talking to Stewart's car.

Crockett found the plane and reported no signs of life. He gave Stewart directions to find the plane. Then he started cruising about. He soon caught a small flash of light from a dry wash about 18 miles from the plane. He flew lower and saw Timpe signalling with the mirror Birnie had left in his pocket—the one item which saved him. Crockett dropped a note containing directions to Stewart, who picked him up and rushed him to the hospital over the rugged, almost impassable roads the posse had traveled. He soon recovered.

Timpe said:

"I had plenty of gas. I was going to clear a ridge on Potosi mountain. I was about 1,000 feet higher than it was, I believe. Suddenly we were caught in a downdraft and we went in."

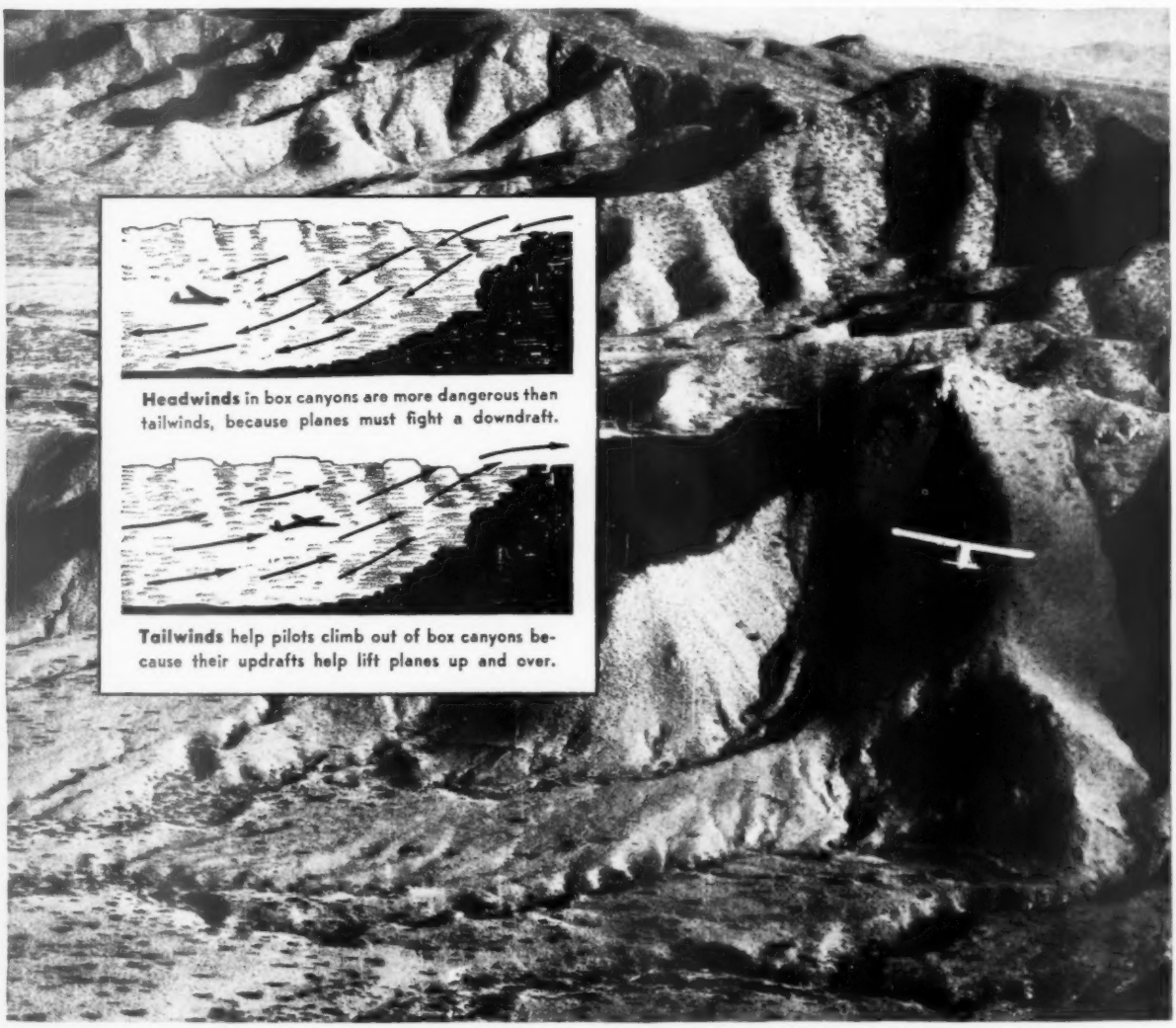
Timpe was not the first pilot to be caught in a desert downdraft nor will he be the last. In a series of FLYING articles written several years ago in collaboration with the writer, the late J. G. ("Tex") Rankin reassured readers with "Don't Fear Downdrafts." He had dropped once from 13,000 to within 150 feet of the ground near Bishop, Calif., and had found a cushion of air which braked his fall. In New Mexico he had dropped from 6,000 feet to within 100 feet of the ground.

Later, after explaining this cushion, he struck a downdraft over Wyoming. At the ground a high wind was literally stripping the cushion away. Tex's plane was demolished.

"The last thing I remember is being about 25 feet above some rocks in a canyon," he said to me later. "Is my face red!" Luckily, he wasn't injured.

There are certain desert flying rules which pilots must follow. If they don't it may mean disaster. The wreckage of their plane, when it is finally found, may meet the fate of other planes which crash in inaccessible places. They are usually dynamited to avoid the repeated reports of crashes from itinerant flyers who spot them for the first time.

These rules are best expounded *(Continued on page 70)*



Headwinds in box canyons are more dangerous than tailwinds, because planes must fight a downdraft.

Tailwinds help pilots climb out of box canyons because their updrafts help lift planes up and over.

Rugged terrain is dangerous for novice pilots. Mountain flying know-how teaches pilots they can climb faster on sunny side of mountains than on shady side. Crossing ridges against a headwind is particularly hazardous because air rushes downhill like a waterfall.

Steep bank is required for tight turns at higher speeds but both the load factor (G's) and stalling speed are increased.

Shallow bank results in a fairly rapid turn in a slow airplane. Bank for bank, however, fast planes will require more time for turning.

Fast or Tight Turns?

By JOHN R. HOYT

Turns are dangerous when you don't understand basic rules.

HOW would you answer the following questions?

(1) Do all planes in the same bank turn equally fast?

(2) Which affects the turn more, increased bank or increased speed?

(3) Which can turn in a smaller circle, a slow plane or a fast plane?

(4) Is it possible to "tighten a turn"?

(5) If a needle-width turn (on a bank-turn indicator) permits all planes at any speed to make a turn in two minutes, does it not follow that rate of turn depends upon bank alone?

(6) Some pilots claim we hold the nose up in a turn by maintaining back pressure on the stick, to increase the angle of attack and gain more lift. Planes in a fast turn sometimes slow down and stall or lose altitude. Therefore, does increasing the angle of attack really increase the lift?

These questions still cause arguments during hangar flying. Many pilots think that speed, bank and rate of turn have little relationship.

First, someone sets up the example of two planes circling an airport. One is flying at 200 m.p.h., the other at 100 m.p.h. It is obvious that in still air the first plane covers ground twice as fast as the second. Both planes bank at 45°. Won't the 200-m.p.h. plane get around the field first?

Someone then claims that the faster plane, in order to make a fast turn, will have to bank steeper than the slower plane. But at this point another pilot will argue that he has a bank-and-turn indicator in his plane and can turn 360° in two minutes merely by placing the needle on the two-minute mark. He says that he can put the instrument in *any* airplane, regardless of speed, and still make two-minute turns. Therefore, he claims that all planes turn at the same rate, depending upon the angle of bank and nothing else.

From this point, all is confusion. *(Continued on page 48)*

THE *Piper Vagabond*

THIS trim little lightplane might have revolutionized private flying five years ago. It surely would have given the private flyer the inexpensive, cheap-to-operate personal plane that he wanted. Of course, there were lightplanes in the class of the *Vagabond* back in those days, but they cost more than $1,990 and they hardly ever gave the kind of performance the *Vagabond* has, at such low operating cost.

There is nothing radical about the *Vagabond*. And it is *not* a worked-over J-3 *Cub*. Much of it is brand-new design, although the overall airplane is as conventional and simple as Piper knows how to make it. That, of course, is the secret of the *Vagabond's* low price. It obviously is being manufactured right out of Piper's current stockpile of supplies, the same stockpile from which *Cub* trainers and *Super Cruisers* come.

As you can see in the accompanying photographs, the *Vagabond* is a high-wing, fabric-covered monoplane. And as Henry Ford would have said in the days of the Model T, ". . . you can have any color so long as it's yellow." The engine is a 65-h.p. Lycoming which, at cruising horsepower (2,350 r.p.m.), burns just 3½ gallons of fuel per hour. And *(Continued on page 82)*

FLYING's CHECK PILOT

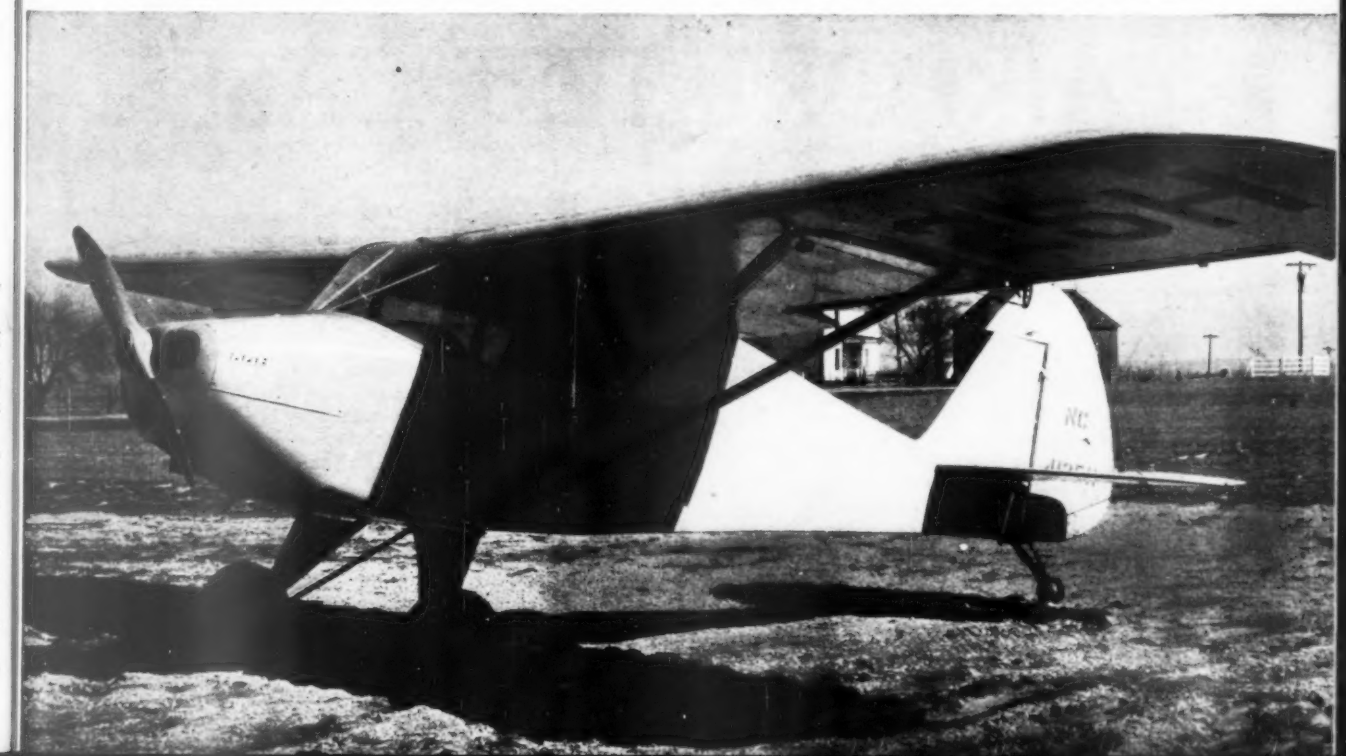
EDITOR'S NOTE

This series of articles is planned to help the pilot and prospective plane owner evaluate aircraft now on the market. Only aircraft holding a CAA Approved Type Certificate are flown. The author is not a professional test pilot. He evaluates each aircraft through the eyes of an average private pilot who flies an airplane either for business or sport.

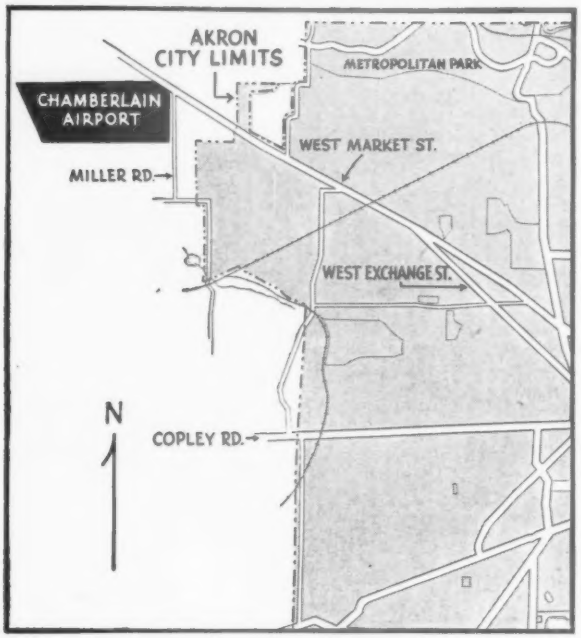
Vagabond is easily serviced. Rod back of prop measures the oil; oil tank cap is under hole in cowl; gas cap is near windshield.

Cockpit photo shows Seabee brake and rudder pedals, gas tank, neatly grouped instruments. New Piper plane has only a right-hand door.

Piper Vagabond is new side-by-side plane with excellent performance on 65-h.p. Lycoming engine. Plane cruises at 90 m.p.h., costs $1,990.



Chamberlain Airport is just outside the northwest city limits of Akron. There were no zoning ordinances prohibiting it, and photograph shows the surrounding area to be sparsely populated by urban standards. Nevertheless, wealthy neighbors objected to the airport and brought court action to close it. Although the airport operators won in the court of appeals, their legal expenses were high and they are still reluctant to complete the port pending possible further action in state supreme or Federal courts.



AIRPORT TEST CASE

Akron decision sets precedents—but proves that even when an operator wins he loses.

By JOHN C. ROSS

CLOSE-IN airports, which have been under heavy attack recently by home owners, got a new lease on life late in December with a unanimously favorable court decision by the Ohio Ninth District Court of Appeals. Though the court's decision does not yet apply in other states, and though it may be reversed by higher courts, it follows a line of reasoning refreshingly different from many other recent decisions by horse-and-buggy judges.

Basically, the court held that people must expect to put up with certain inconveniences in the name of progress. Of course an airport may be noisy and it may be dusty or dirty—but the same is true of highways and of big factories. The decision regards the airplane as a modern vehicle intended for public benefit and deserving special consideration on its own merits. If the same viewpoint is upheld by other courts, the whole trend against close-in airports may be changed.

But in addition to the hope that this case has for airport operators, it is also a grim warning to them—a warning of long delays, of high court costs, and of expensive studies and investigations if they ever get involved in similar litigation.

The story of the court decision goes back to the purchase of 450 acres just outside the city limits of Akron, Ohio, by John J. Chamberlain, Akron manufacturer and industrialist. The property adjoins the plush residential district of Fairlawn Heights, where wealthy Akron residents have their homes.

On another occasion, residents of Fairlawn had influenced a rubber company against using the 450-acre section for an industrial use, although the land is without any zoning restrictions and zoning does not enter the present case. Nevertheless, the land was leased from Mr. Chamberlain by Chamberlain Engineering Corporation, of which Mr. Chamberlain's son, J. M. W. Chamberlain, is president. Chamberlain Engineering Corporation has a large fixed base operation at Akron Municipal Airport and promptly began work on the newly leased property with the intention of starting a Class I airport for private pilots.

Immediately, neighboring home owners complained in writing. When Chamberlain Engineering Corporation continued its work on the $700,000 project, 101 wealthy property owners banded together and sought an injunction to keep the airport from operating.

The resulting litigation shows what close-in airport operators can be up against, even when they have the money and the determination to fight back. Chamberlain is a tall, slender man with a deceptively mild air. He is an engineer, a radio fan, and a pilot. Besides his fixed base operation at Akron Municipal Airport, he has an interest in plastics, chemical and pottery businesses. He speaks softly but he doesn't scare easily—even when opposed by powerful interests.

The first case was heard before Judge Stephen C. Colopy of Summit County Court of Common Pleas in March, 1947. It was one of the longest ever fought in Summit County Court. When Judge Colopy ruled against Chamberlain and ordered an injunction against the airport, Chamberlain carried the case to the Court of Appeals. This is the court that has now made the precedent-shattering decision in favor of close-in airports.

So far there have been more lawyers retained than the average airport operator would care to meet in a lifetime. Chamberlain has been represented by James E. Alpeter, general counsel, and the law firm of Brouse, McDowell, May, Bierce, and Wortman. But his opponents have gone Chamberlain six better as far as numbers *(Continued on page 73)*

HIS COURT BATTLE HELPS ALL OPERATORS

Attacks against close-in airports have been one of private flying's greatest problems. J. M. W. Chamberlain's court fight has aided airport operators by helping set legal precedents which protect them.

Inadequate maintenance discourages private flying, Anderson concludes at end of 10,000-mile survey.

This is Private Flying

LAST OF A SERIES

By GEORGE E. ANDERSON

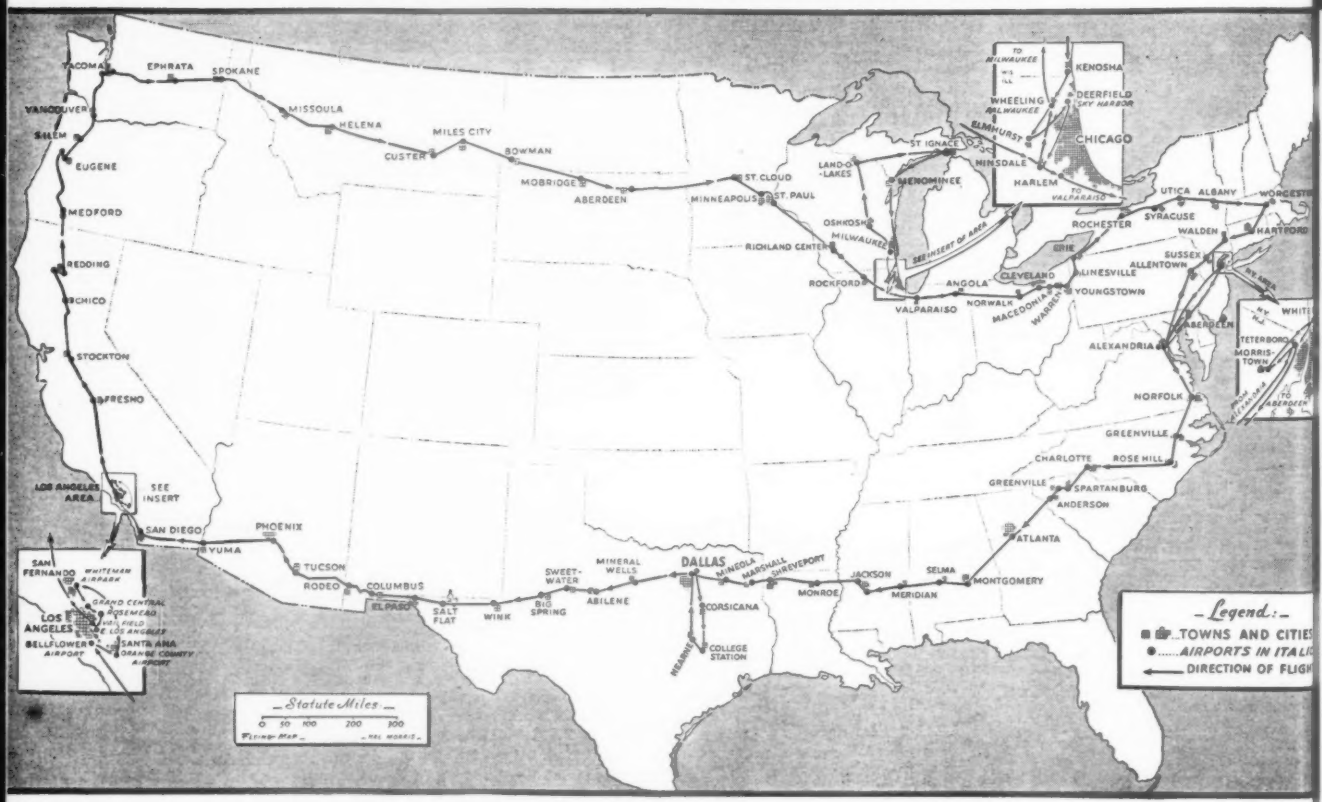
I SET OUT on the southern and final leg of my coast-to-coast airport survey from Sussex, N. J., where I was held up for two days by bad weather. The field is well-marked and neat and they treated me with all the courtesy any itinerant pilot could expect, but they were unable to provide me with A. & E. service. During this time I watched an air-show and the size of the crowd amazed me even though it rained intermittently and the field was off and on contact all day.

The author has been a pilot since 1940, an A&E since 1941. Because of his experience in checking "gripe" airports for AOPA, he was asked to make the survey on which these articles are based. During the war, Anderson worked on WTS and CPT programs, later was an engineer on B-29 engine nacelles and control surfaces. He is now maintenance director for an eastern aviation firm.

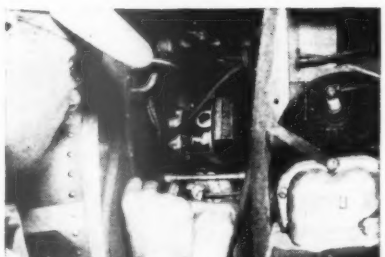
On the last leg of my trip I continued to check airport service, courtesy, cleanliness, and quality of maintenance. As I landed at each airport I purposely jimmied up the plane, crossed the plug wires, monkeyed with the tail spring, pulled out the primer, or performed some other minor maladjustment which the sharp eyes of an experienced mechanic should have noted without much trouble.

On this southern and southeastern jaunt I noted a continuation of somewhat better service and somewhat sharper maintenance that I reported last month in the north and northeast. But I also noted some very slovenly service and poor trouble-shooting which got me into a couple of long and expensive delays. I am convinced that my two-month trip brought me into contact with enough airports to justify the generalizations I have made about service.

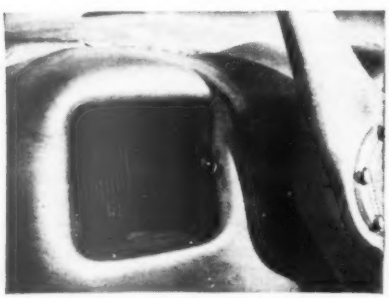
ROUTE OF FLYING'S TRANSCONTINENTAL SURVEY FLIGHT



Mechanic checks engine at stop on Anderson's trip. Some A & E's seemed to have difficulty trouble-shooting simple problems.



Magneto (above) was battered by constant mechanic tinkering. Bent cowling (below) was result of a sloppy maintenance job.



Altogether I stopped at exactly 100 airports in 27 states.

I found little to confirm the suspicions of many pilots that airports are out deliberately to put the "bite" on itinerant pilots. Rather, I found that many mechanics are simply unable to trouble-shoot accurately. This ended up by costing me money, and if I had not been a mechanic myself, I might have concluded that the maintenance men who got me into jams were out deliberately to chisel me. Instead, they just made mistakes.

I had a little better luck finding a mechanic at the next stop, Allentown-Bethlehem Airport, than at Sussex, but no luck at all on the job he did. I told him that the left mag was dropping. He said it was probably the plugs. We ran up the engine and sure enough it dropped about 75 or 80 revs. I taxied to the hangar and he pulled the plugs.

He showed me some dirt on the points of one and I pretended to be duly impressed. But the dirt was on the tips of the points and was oily. The rest of the plug was clean and dry, indicating that the dirt came from bumping the plug against the cylinder as it was removed. The engine was in the same shape when I left.

And so to Washington and thence to nearby Hybla Valley airport, not far from Washington National in Virginia, where I decided to try to get my logdometer fixed. This is an instrument we had installed on the Luscombe experimentally. It was loaned by the Aero Instrument Corp., Ann Arbor, Mich., and was designed to register all flight time automatically. It had not been working and I wanted to find out why.

I had to wait for the instrument man most of the morning, and it was noon before he started *(Continued on page 50)*

Amphibian pilots can make good use of their planes in the Smoky Mountains, where most TVA lakes are stocked with fighting trout.

A FLYING Holiday

THE *Great Smokies*

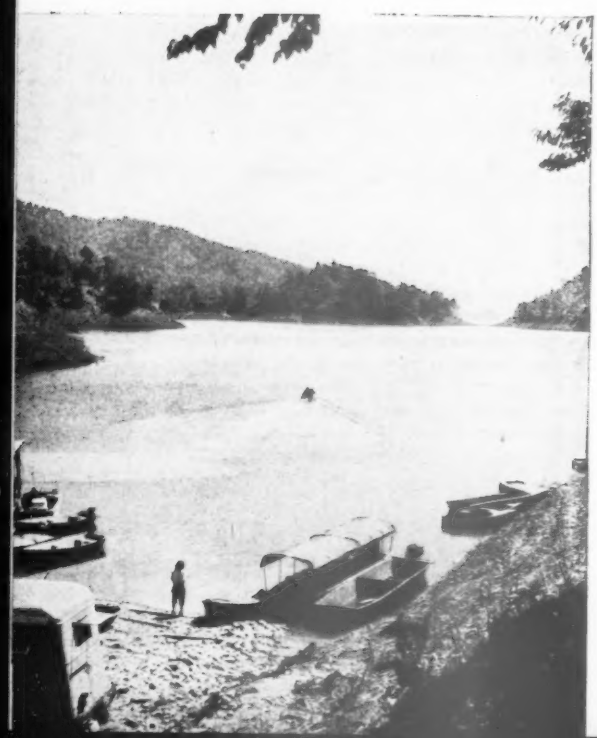
Like to fish, swim, hike and fly? Here's a mile-high vacationland.

AT FIRST THOUGHT, the mile-high region of the Great Smoky National Park on the North Carolina - Tennessee border sounds forbidding to the airman — and often results in his picking lower-level territory for FLYING Holidays. But easily accessible airfields are located on the outskirts of the area, and flyers can reach the park with a minimum of difficulty after tying down their planes.

In the Park itself, over 600 miles of trout streams (season from May 16 to August 31) are filled with fish that give even the expert a run for his money. For the outdoor enthusiast who likes to trek through rugged terrain, there's a 71-mile Appalachian Trail, with eight roadside shelters spaced for easy one-day hiking trips. The pilot who's not used to long tours on foot can rent horses and pack animals by the hour, day or for longer periods in towns bordering the park. Guide service is also available.

Free campgrounds are at Smokemont, N. C., and Chimneys, Tenn., on the trans-mountain highway, and persons wanting to spend the night in remote sections of the Park can obtain permits from the Office of the Superintendent at Gatlinburg, Tenn., or from rangers or wardens.

The Park is no cellophane-wrapped *(Continued on page 62)*



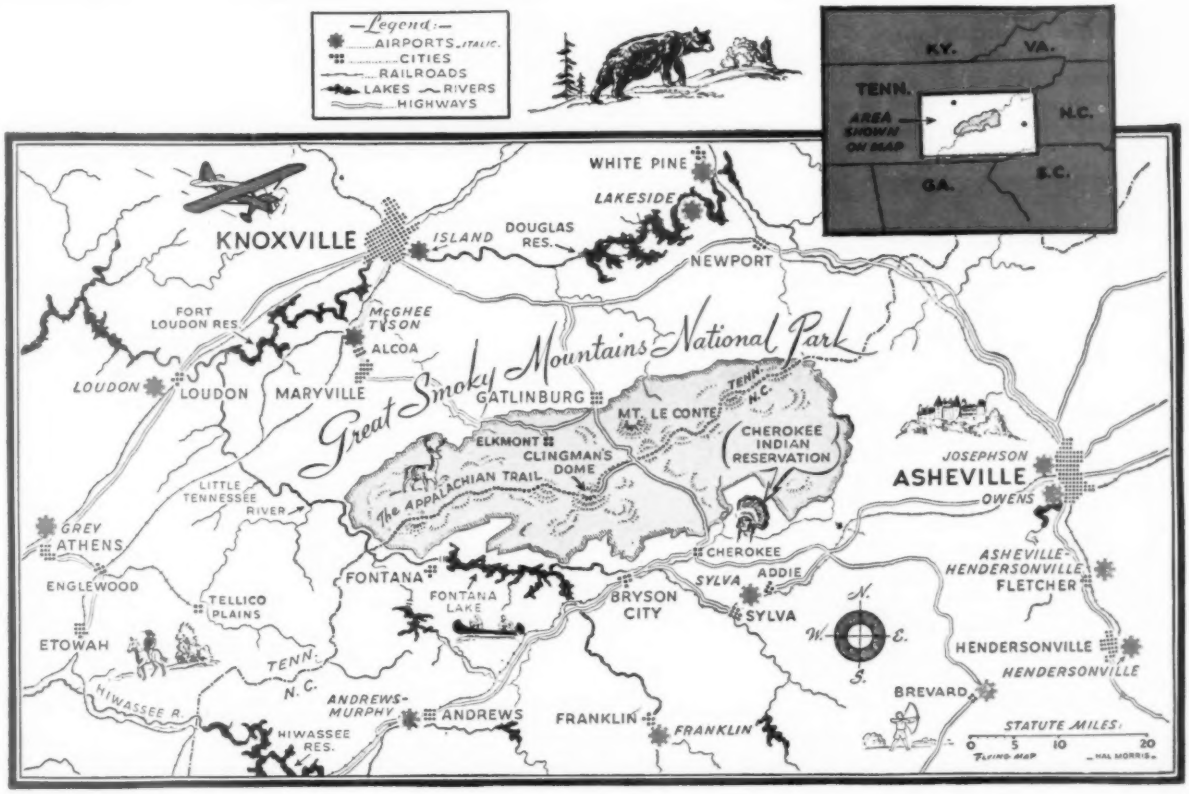
Fontana Lake, just south of National Park, has 300-cottage resort nearby.

Smokemont Camp in National Park is maintained by U. S., has free sites for overnight stays. Chimneys, Tenn., also has campground.

Swift streams crisscross the steep mountain slopes. This waterfall is not far from Franklin (N. C.) airport's 2,800-foot strip.

Franklin Airport is located half-mile from town. Operator Grant Zickgraf can help flyers get motor transportation, guides, boats.

Typical resort is Gatlinburg Inn, located on Tennessee side of the park. Rates range from $3.50 for single to $8.50 for double.



REPORT FROM WASHINGTON

By FRED HAMLIN

PICKED UP A LOT of dope the other day about the 72nd Reconnaissance Squadron, which is specializing in mapping and polar navigation in the Arctic, with a base in Alaska. The outfit has flown an estimated 5,000 hours and more than 1,000,000 miles since it arrived at Ladd field in July, '46, and has made aerial maps of thousands of square miles of previously unexplored land.

It has made two other discoveries that will be in the history books. It rediscovered the magnetic North Pole and worked out a new system of navigation enabling planes to fly anywhere in the Arctic and know their location. The North Pole discovery was the result of more than 1,000 variation readings. It revealed that, far from being a fixed point, the "Pole" is a magnetic field elliptical in shape, made up of three poles.

Major pole is on Prince of Wales Island, with two local poles on Bathurst Island and Boothis Peninsula. In the navigation department, the 72nd experts devised a grid system and enlisted radar operators to estimate wind, drift and ground speed exactly, even through an overcast. The 72nd has been spending a lot of time flying over the otherwise inaccessible Arctic Ice Cap, birthplace of many a storm that grows up to strike the U. S. and Canada. Their reports are filed at regular intervals in flight to ground-based weather experts, who analyze the data and pass it on south.

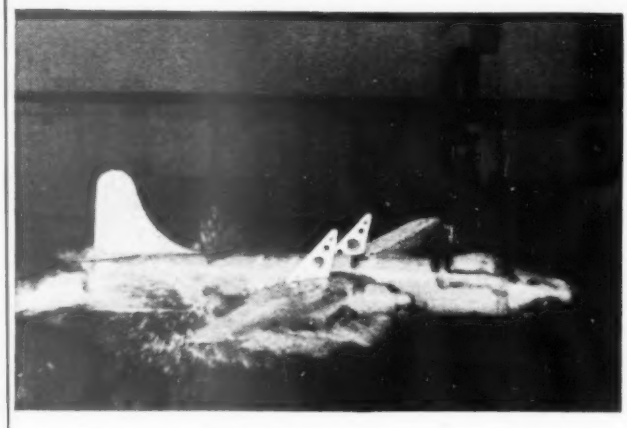
Toughest problem on the flights is to determine and maintain direction. Compasses are often useless and always unreliable. The astro compass is therefore used to determine direction and the aircraft's gyros to maintain it. The something new which has been added in the Arctic to insure accuracy is radar. Its operator sits glued to his set, constantly figuring drift and ground speed by using ice cracks as targets on the scope. Radar is particularly indispensable at night, when darkness—in the Arctic winter, that's most of the time—makes the driftmeter useless. Even on bright moonlight nights, the driftmeter cannot read adequate data from the ice cracks. Best thing that can be said about the system is that it works.

Tough Flying

Navigating is just one of the more refined problems facing Arctic Air Force flyers. In case you're planning to pay the region a visit, the best advice from these experts is—don't. Not in a plane, anyhow. Weather is violent and changeable. You can be enveloped in a lazy fog one minute, buffeted by a hundred-mile-an-hour williwaw the next. Fog is specially temperamental in sub-sub-zero weather. "Town" fogs hover over living quarters, created by the heat of the houses and their occupants. You can even blow up a fog from the heat of your exhausts when you're warming up the engines. Plane maintenance and preparation for flight is a major operation. Engines, wings, tail surfaces, windshields, turrets and carburetor air scoops must be covered by a specially-designed waterproof material when the plane is tied down. A layer of fabric must be placed under each tire to prevent freezing to the ground. (Bush pilots use tent poles.) To prevent frost from forming inside the cabin, emergency escape hatches have to be left open but covered enough to keep the snow out. One thing you don't have to worry about—finding a tie-down stake. Just tighten your rope and pour water on the ground ends. It's like anchoring them in iron. Oil is diluted with 30 per cent gasoline, giving it a viscosity down to 60° below. Batteries must be taken inside between flights or they'll freeze tighter than an overgrown ice cube. On take-off, use the lift of your plane's wings as quickly as possible. This cuts down ground friction *(Continued on page 74)*

Arctic maintenance is rough. Batteries are re-installed in P-80 after removal between flights to prevent freezing.

Republic XF-12, four-engined photo plane, is now at Wright Field. Thrust from exhaust helps it fly faster than 450 m.p.h.



HAVE YOU SEEN?

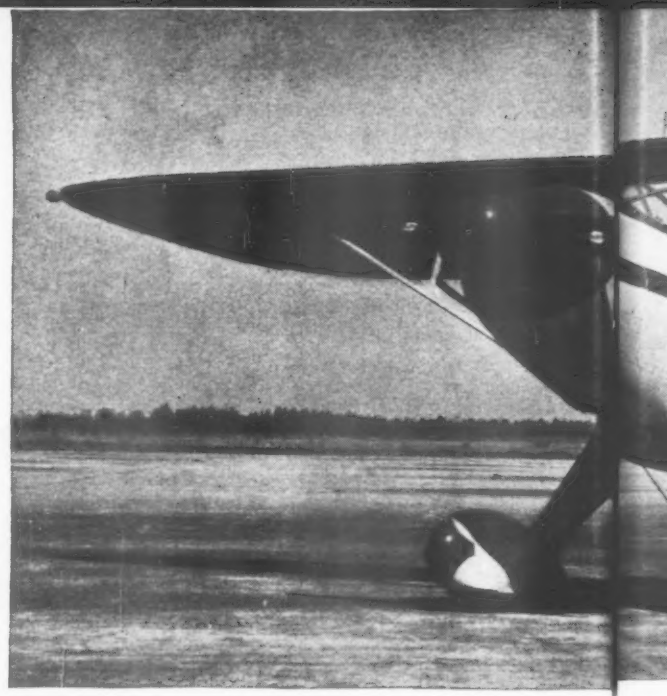
NACA tests new hydro flap on model plane. Navy will equip several of its newer land-based patrol craft with flap which serves as hydroplane ski for forced landings in ocean.

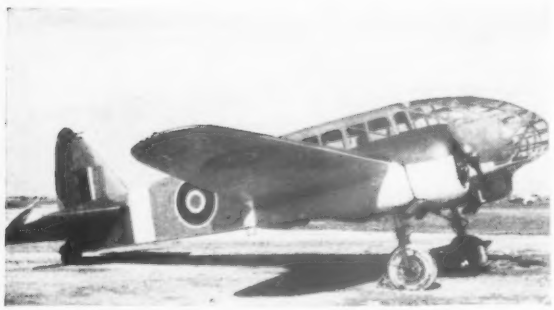
North American XB-45 buzzes runway at Muroc at better than 500 m.p.h. The big four-jet bomber was only a few feet off the runway when this photograph was taken during a speed calibration test. Production B-45A's are being manufactured at North American's Long Beach, Calif., plant.

HAVE YOU SEEN?

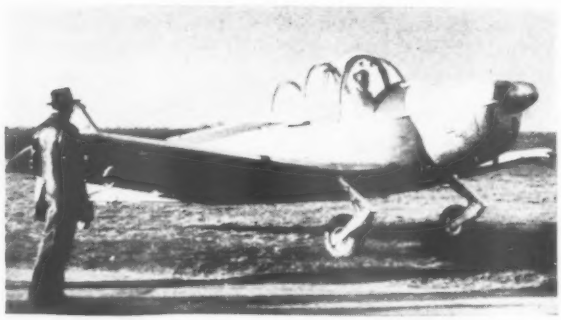
continued

PAA radar altimeter gives exact reading of plane's altitude, can be set to warn pilot at any of five different altitudes.





Captured Caproni CA-310 has two 700 h.p. Piaggio engines, top speed of about 250 m.p.h. RAF used it as communications plane.



Fokker S-11, dual-control Dutch primary trainer, has 190 h.p. Lycoming engine. The plane's cruising speed is 106 m.p.h.

Belgian primary trainer, produced by Fairey, has a 145-h.p. Gipsy Major X engine, but can be fitted with a 155-h.p. Cirrus Major III. Maximum speed is 135 m.p.h. and it will cruise for 395 miles at 104 m.p.h. It is fabric-covered, but has all-metal basic construction.

New Monocoupe has Lycoming 115-h.p. engine, cruises at 138 m.p.h., has nearly 700-mile range. Standard model will sell for $3,890.

Junkers model plane (above, left) has strikingly modern configuration though it bears date June 7, 1917. It closely resembles Boeing B-9 bomber (above, right) of early '30's, and has other modern features such as four engines buried in wings geared to props.

Goodyear cross-wind gear are being installed on Stinson Voyager models and are available for Cessna 120's, 140's and 170's. Price is about $340.

First Canadian helicopter, SG Mark VI-D, is three-place type with 165-h.p. Franklin.

Instrument flying is rough—when instruments don't work. Author in A-24 remembered too late you can't rely on weather getting better.

I Learned About Flying From That! NO. 102

By HALLOCK B. HOFFMAN

Captain, Air Force Reserve

Lost in the soup, instruments out —no wonder this pilot was scared.

IT WAS just like in the movies. There I was at 5,000 feet, clouds above me, below me, all around me. The radio was working only every tenth minute. The gyros were spinning and tumbling. The compass was nice and steady, right on course, but I soon discovered it was stuck again. I was on instruments, with very few instruments left to be on. In the back seat, poor Johnny was sweating blood, and considering the advisability of hitting the silk.

It was that kind of flight. All my fault—I cut some corners, took a few chances, assuring myself, "I'll get through. I always have. Maybe a few clouds, but it will get better ahead."

We had started from Dayton—Patterson Field. It was the last year of the war and I was ferrying a surplus A-24 from Connecticut down to a storage depot where the venerable old craft was to be retired forever. This one was really ready. Its better days were all behind it; it was tired, and deserved a rest.

Early that morning I had trotted down to Operations to check the situation. The weather was lousy—light rain and low clouds all the way, both north and south. The forecaster said it would probably hang on for a couple of days. A warm front stretched across the country from northern Michigan to Texas, passing just west of Chicago and moving slowly if at all. I couldn't fly instruments in the plane because I had already discovered the gyros were on the blink—the suction pump was bad—and the radio had a loose wire in it some place so that every once in a while *(Continued on page 66)*

Airfoam

"Sleeperettes"*

Set New High in Comfort

The Sleeperette*—Pan American's exclusive, new aircraft seat, completely cushioned with **Airfoam** made by Goodyear—sets a new high for travel comfort aboard Pacific-Alaskan Division Clippers. Yes, there are three good reasons why operators and manufacturers prefer **Airfoam** for aircraft seats. First, this latex cushioning supplies comfort that lessens flying fatigue. Second, its amazing durability eliminates seat maintenance and repair—seats last the life of the ship. Third, a weight saving can be effected by designing seats to take full advantage of **Airfoam.** For full information about this modern, luxury cushioning, write: Goodyear Aviation Products Division, Akron 16, Ohio or Los Angeles 54, California.

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MORE AIRCRAFT LAND ON GOODYEAR TIRES THAN ON ANY OTHER KIND

AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is: "To make flying more useful, less expensive, safer and more fun."

Headquarters are: 15th and New York Aves., Washington 5, D. C. Members also receive a special AOPA edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING MAGAZINE.

AOPA RECENTLY questioned CAA in connection with the installation of the new VHF emergency frequency, 121.5mc., and requested that priority rating be given installations in the Pacific northwest, mountainous and southern swamp areas.

Association spokesmen stressed the fact that these areas are important points where search and rescue operations for downed aircraft can be greatly assisted by a simplex radio communication channel. (This type channel permits two-way communication between private, military and airline aircraft and ground stations.) CAA officials have advised AOPA that they plan to follow AOPA's recommendations, and installations will begin during 1949.

In connection with the VHF program, CAA officials also advised that the CAA has completed its program to monitor VHF air-to-ground transmitting frequencies at all but 21 CAA towers and communication stations. They stated the remaining 21 stations will be equipped in the near future.

1948 FLIGHT SEASON

Advance reports indicate 1948 will be the biggest flying year in aviation history.

To date AOPA has routed several hundred vacationing pilots to all parts of the U. S. and to almost every country in the Americas.

AOPA Units and other flying organizations are also completing plans and scheduling dates for hundreds of breakfast, weekend and novelty flights for the spring and summer season. Pilots interested in participating in AOPA's flight program may request name and address of nearby units and ask the Unit secretary to add their names to his mailing list.

CONTINUOUS WEATHER REPORTS

One of CAA's present projects is development of a continuous oral weather reporting system to be transmitted over designated frequencies. Probable initial frequency selection will be 111.1 mc.

Although the service will assist all aircraft, it is primarily a private pilot's weather aid. Plans now call for a recorded continual weather report into which the latest information can be inserted. In this manner, the private pilot will be able to obtain up-to-the-minute weather by tuning to the designated frequency.

At present scheduled voice transmissions, normally transmitted at 15 and 45 minutes after the hour, are often crowded off radio range facilities by overloaded airway traffic control instructions.

RADIO REPORTS

CAA officials have requested AOPA's help in obtaining information regarding difficulties encountered in contacting towers on the private pilot's VHF frequencies 122.1 and 122.5.

With CAA cooperation, AOPA has prepared a special pad of forms to be used in reporting failure of CAA stations to answer private pilot's transmissions on 122.1 and 122.5. The completed form should be returned to AOPA immediately so copies may be forwarded to regional and Washington CAA offices. Prompt action on the pilot's part will enable immediate CAA investigation of complaints.

ATTENTION: FLYING CLUBS

During the past few months AOPA has received many requests for the names and addresses of flying clubs in various sections of the country. Some are from pilots interested in aircraft club-ownership; others just want to have an opportunity to meet fellow pilots.

To date AOPA has not been able to answer these requests satisfactorily. However, in an effort to obtain a complete listing of flying clubs, staff members have prepared a flying club questionnaire.

Clubs interested in co-sponsoring flights, increasing membership and having names listed in Washington should write AOPA. The address is 520 Washington Building, 15th and New York Avenue, N. W., Washington, D. C.

Note: This service is open to both AOPA and non-member pilots. It will not obligate your club in any manner.

FOR CAESAR—AND PILOTS

(Courtesy Aero Insurance Underwriters)

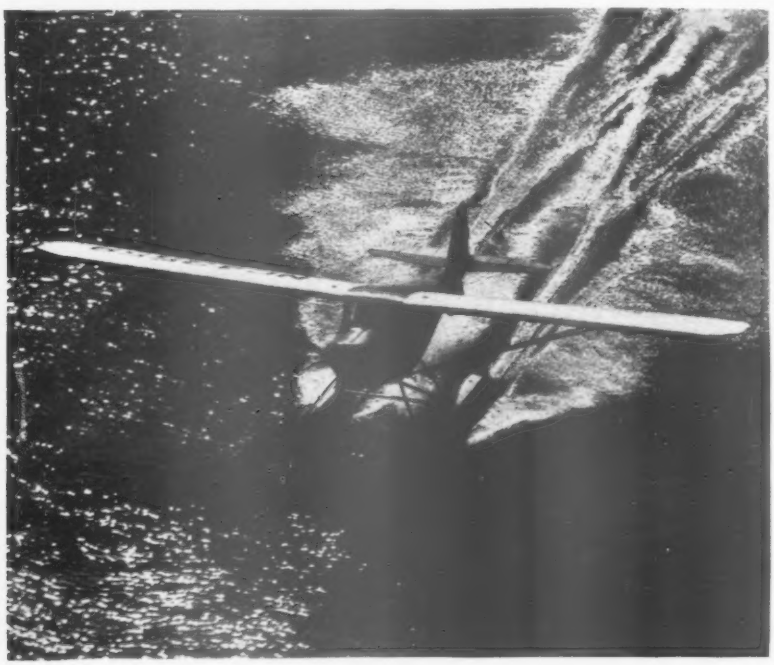
"Beware of the Ides of March" was the warning given Caesar. And it's good advice for flyers who will encounter tricky spring winds, which have a higher average velocity than those in other seasons. Some precautions to take in strong winds:

1. Reduce air speed below cruising in very bumpy air. This protects your plane from excess stresses.

2. When taking-off and landing, one should climb, glide and turn at a higher speed than the minimum. That gives a margin of safety in case a gust dies out suddenly and automatically reduces your air speed.

3. When taxiing down wind keep the stick forward. This is old advice but insurance companies continue to pay losses because pilots do not observe the ruling.

4. If the wind gets a wing up while taxiing or landing, correct by revving up the engine, movement of the rudder and easing the stick forward. The rudder is effective at low speeds and easing the stick forward diminishes the wing's angle of attack, decreasing the effectiveness of the wind.



Seaplane pilots will receive additional benefits following merger of AOPA with the Seaplane Flyers Association. A seaplane division and advisory panel has been formed by AOPA.

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Congressional Aviation Policy Report

(Continued from page 15)

tive requirements in war."

Until the United Nations or a similar international organization can give a guarantee of peace, the Congressional Board believes that the best way to assure peace is air power.

In most of its specific recommendations the Board takes what could be termed "the common sense approach." It urges continued research, development and maintenance of airways, fostering of air commerce, encouragement of small businessmen airport operators, coordination of military and civil aviation and an aeronautical educational program.

Nevertheless, private flying gets little more encouragement in the new report than it did in the Commission's Report, "Survival in the Air Age." Only one recommendation affecting private flying and two specifically affecting fixed base operators are included in the Report.

NACA and the Air Forces are urged to cooperate in developing a small plane with a wide speed range which could double in brass for a private aircraft or a military observation plane. It should be safe and capable of low-cost production.

Lightplanes, the Board holds, like the automobile are largely a matter of private interest and responsibility. Nevertheless, "personal aircraft, private pilots and technicians, and the industry which supplies them, serve public interest and national welfare as a reservoir of aircraft and personnel for special tasks during an emergency. . . . Light aircraft manufacturers produced thousands of liaison planes for the Air and Ground Forces."

Consequently, the report continues, "development of small aircraft for use by Army Ground Forces liaison planes, and which can readily be adapted to personal use by civilians, is a logical program for NACA and the USAF. This should result in a safe and efficient light aircraft available to the private flyer at low cost." The Board feels that the lightplane industry should be kept in a condition to provide the "quick expansibility needed in emergency."

Personal flying would be further aided by greater emphasis on airways, by continued emphasis in airport construction programs, by simpler and less-expensive international border restrictions, and by delegating responsibility for the safety and integrity of lightplanes to the manufacturers themselves. The manufacturer would be given the responsibility of determining operational and safety standards, and of certifying airworthiness, operational limits and flight characteristics. The civil aeronautics authorities, however, would have the power to revoke manufacturers' certificates for cause.

The first recommendation specifically aiding lightplane manufacturers and fixed base operators is one providing for flight and technical aviation courses in colleges and universities with full scholastic credit. There is no detail on the extent such flight courses should take, and the intent seems mostly to provide properly trained teachers.

Operators would be further aided by taking over the maintenance of some military planes. A portion of military aircraft would undergo overhaul on a contract basis and the employees of the operators would be encouraged to be members of a reserve component of the armed services. Present practices of the armed services in overhauling aircraft in their own depots fall far short of solving problems of providing maintenance facilities and personnel available for duty with combat units in case of hostilities.

The report bitterly criticizes the Joint Chiefs of Staff for not conducting integrated studies on a unified plan of action. "The Joint Chiefs of Staff have been requested repeatedly to furnish a unified plan to this Board but they have yet to do so. Moreover, there is no present indication that such a plan is in process of determination. . . . Unyielding adherence to service loyalties at the expense of national security is a luxury the Nation can no longer afford."

To defend the country, the Board recommended two levels of defense:

Plan A would provide instant retaliation upon a major enemy. Under Plan A, total airframe output would rise steadily until 1953, when it would level off at 110,000,000 pounds of new and advanced types of aircraft annually. An estimated total of 35,041 planes would be available—20,451 to the Air Force and 14,500 to the Navy. The over-all United States budget would begin in fiscal 1949 at $41,300,000,000 and rise to a peak of $47,200,000,000 in fiscal 1952, when it would begin to drop, leveling off at $45,370,000,000 in fiscal 1954. Total appropriations for aircraft would level off at $4,400,000,000, annually, and for all aviation at $9,800,000,000.

Plan B would enable the United States to "hold" an enemy until its industrial capacity could be mobilized. Under Plan B, complete modernization of the air services at the plan's specified strength would be reached about the end of fiscal 1954. The over-all budget would begin at $40,960,000,000 in fiscal 1949; reach its peak at $45,420,000,000 in fiscal 1951 and level off at $41,470,000,000 in fiscal 1954. Total procurement for aircraft would level off at $2,960,000,000 annually, and for all aviation at $7,600,000,000.

The Board looks with concern upon the interference of the Bureau of the Budget in military expenditures. Confronted with the arbitrary limits of the Federal budgets, the Bureau makes arbitrary cuts in amounts allocated for military and naval aviation. "They do not even approximate the stated requirements of the services," the Board complains.

Here are summaries of some of the Board's other important recommendations for combat aviation, air transport, aircraft manufacturing, research and development, and Government organization:

COMBAT AVIATION. A Federal airways system should be established under a single civil head to facilitate integration with military aviation in an emergency, and appropriate studies should be made.

The Federal Government should sponsor the design and development of prototype transport and cargo aircraft intended primarily for commercial use but suitable for certain military purposes. Funds should be earmarked specifically for this purpose. The Board feels that transport-type planes of much better operating and utilization characteristics than any now being built are needed to provide the low operating cost and high performance that will make possible commercial employment for large numbers of such planes.

AIR TRANSPORT. "Civil and military aviation are indivisible in assessing total American air strength," says the Board. "The air-transport industry of the United States and the military air arms must fit into a single pattern."

Particular emphasis is placed on regular all-weather commercial service. "With present navigational and landing aids, air traffic control and airports, the airways system of the country is near the saturation point, even for the present fleet of 1,000 aircraft."

Lack of regularity is also deemed a major

15 YEARS AGO

FROM the May, 1933, issue of this magazine:

Silent liner of the air was the name given the new Curtiss *Condor* transport. Engine noise was reduced 50 per cent by running the exhaust under the lower wing. Passengers could converse without raising their voices. Another improvement was sufficient room for passengers to walk up and down the aisles.

The Vance Flying Wing express was not a true flying wing but was built on that principle. It had a single wing with a span of 55 feet, an outrigger tail, double rudders and a streamlined tail wheel on each outrigger spar. The pilot's cockpit and a Pratt & Whitney *Wasp* engine were streamlined into the wing. The thick section of the wing carried fuel and cargo. In speed tests the plane attained a speed close to 200 m. p. h. The wing held 10 gas tanks with a capacity of 1,200 gallons—sufficient for 48 hours of flight and a range of 7,500 miles.

Fifty hours of accredited solo flying were required for a private pilot's license instead of 10, under the terms of a new amendment to the Air Commerce regulations. This amendment also created the grade of solo pilot for students who had completed 10 hours. Objective of this amendment was to insure that pilots acquired a substantial amount of experience before carrying passengers.

Fastest European transport was the French tri-motored Wibault-Penhoet plane. Its cruising speed was 126 m. p. h. The all-metal, cantilever monoplane accommodated 10 passengers and a crew of two. Fuel tanks were in the wings, providing room in the fuselage for an exceptionally large luggage compartment. It was powered with three Gnome radial 350-h. p. engines and it could fly on one engine if necessary.

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Feature	Commercial Airliner	Swift 125
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Retractable Landing Gear	√	√
Hydraulic Flaps	√	√
Hydraulic Shock Absorbers	√	√
Navigation Lights	√	√
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factor in the air transport industry's poor financial condition, shown by recent heavy financial losses. If the present air traffic control system remains, the Board estimates that the air lines, with 1,000 planes, will lose approximately $40,000,000 annually due to air traffic congestion delays, flight cancellations and schedule unreliability.

Accordingly, the Board gives top priority to the airway and traffic control aids program of the Radio Technical Committee for Aeronautics (RTCA). The nine-year research and development project would reach an estimated cost of well over a billion dollars—but would be offset in part by eliminating the $40,000,000 annual losses detailed above. The new system, the Board believes, would enable the carriers to increase their on-time schedules from 46 per cent today to an estimated 95 per cent, and to increase their fleet to 5,000 aircraft!

The Board urges better weather services, continuation of the Arcata project for the development of additional visual landing aids, legislation for the carriage by air of parcel post, and the development of policies dealing with air cargo, contract flying and charter service in the transport field.

AIRCRAFT MANUFACTURING. The United States cannot afford to maintain in peacetime the Air Forces required to win a war. Therefore plans must be prepared in advance, and it is essential to have enough peacetime production contracts to maintain an industrial potential capable of rapid expansion. Contracts should be let and designs developed with this in view. Congress is urged to help the air services in long range planning by removing time limitations on the expenditure of appropriations and upon contract authorizations.

Congress is also urged to authorize a succession of five-year programs for research, development and procurement of aircraft to help maintain a rapidly expandable industry. These programs would be reviewed each year.

With safeguards, the Board also would encourage the sale to friendly foreign governments of military planes and aviation ground equipment produced in the United States.

RESEARCH AND DEVELOPMENT. Research and development account for only about seven per cent of all the Government's aeronautical expenditures. Yet the entire aeronautical program is shaped around the results achieved. An intensive and well-balanced program of research and development geared to both military and civil needs is urged. NACA, and the Research and Development Board of the National Military Establishments should expedite preparation of a unified plan for transonic and supersonic research and development facilities.

The Board distinguishes between research and development. Both should be considered separate budget categories, it believes. "Only about one-fifth of the $300,000,000 1948 research and development expenditures are devoted to research" alone, the report complains. "A cut in research funds may cripple the whole program. A cut in development funds may only cause delay or reduce the number of protoypes developed. . . .

"Whenever over-all budget cuts are ordered, a flat percentage should not be applied to the total research and development programs. Instead, research projects should be considered separately from those of development."

GOVERNMENT ORGANIZATION. Far-reaching changes in the present setup of the CAB and CAA are proposed. The most important is the recommendation that the CAA be abolished, and an "Office of Civil Aviation" be created in the Department of Commerce, under a Director of Civil Aviation who would report to the Assistant Secretary of Commerce.

One reason for this recommended change is overlapping duties between CAA and CAB, and confusion of operating and policy-making functions in the CAA.

Thus, if the Board's recommendations are accepted by Congress, the duties now performed by the CAA and CAB would be split as follows:

1. The Office of Civil Aviation would be composed of two major divisions, (a) the *Federal Airways Service*, which would run all Federal airways, control towers, etc., and would facilitate the integration of the airways system with military aviation in an emergency, and (b) the *Bureau of Aeronautical Development*, which would administer the Federal Airport Act and other promotional, experimental, and educational activities of the present CAA.

2. The *Civil Aeronautics Board*, which would promulgate, administer, and enforce regulations relating to the competency of airmen, certification and airworthiness of aircraft, air carrier operating specifications, and other regulations relating to the economics of operations.

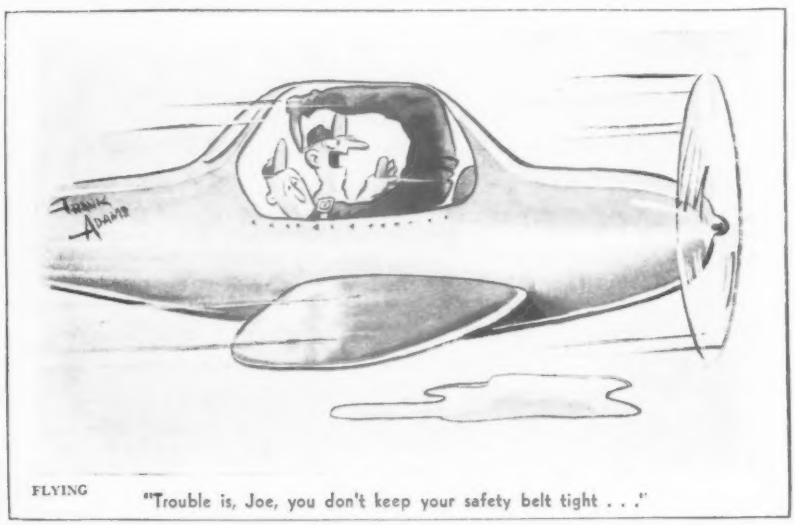
The Federal Airways service, on the other hand, would promulgate and administer regulations relating to the movement of aircraft in flight and at airports. The CAB would hear appeals from the Federal Airways Service in cases involving violation of regulations.

The Congressional Board has been disturbed by the heterogeneous nature of CAA activities, and objects to the fact that a single agency operates facilities, makes rules, interprets them, administers them, and enforces them. "This violates the principle Congress has followed in placing quasi-legislative and quasi-judicial functions in the transportation field in independent agencies." (For an understanding of the abuses this has led to, see "Blackjacking the Pilot," page 18.)

The CAB would continue, then, as an independent agency, and would be given additional independence. It would be strengthened by freeing it of all "administrative housekeeping ties" with the Department of Commerce. It would handle its own budget, procure its own personnel, and assume a status similar to the Interstate Commerce Commission and the FCC. In addition to its five board members, the Board would have an executive director who would have charge of administering the Civil Air Regulations promulgated by the Board, including certification of airmen and aircraft. The Executive Director would operate like the head of a corporation, with the Board members determining policy.

In addition to this completely new setup, the Report recommends that an independent *Director of Air Safety* be appointed by the President and confirmed by the Senate. He would head a division investigating and analyzing air accidents, and submit reports and recommendations to the *Air Coordinating Committee* which would be reestablished to coordinate and recommend aviation policies affecting two or more agencies of the Federal Government. The Air Coordinating Committee would be composed of representatives of the agencies primarily concerned with aviation. "A fundamental weakness of civil aviation is lack of adequate coordination of policy within the executive departments," the Report charges.

The Congressional Board feels that aviation has become such an important matter, and its administration so complicated, that a general overhaul of Federal Agencies concerned is necessary. The Board is primarily concerned with military aviation, and its recommendations to strengthen the civil aviation setup are made only in the belief that it will also strengthen military aviation. If its program is approved by Congress, a whole new civil aviation organization will be created. END



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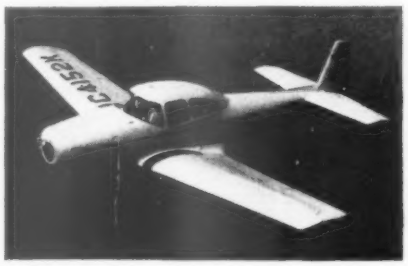

"SAFE"—"EASY-TO-FLY" was No. 1 on the long, favorable list of comments about the 150-mph *Navion*. Almost every owner stressed stability in rough air, comfortable, relaxed flying and effortless control. Inter-connected rudder and ailerons and special wing design are some of the reasons why *Navion* gives super-smooth flying.

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Fast or Tight Turns?

(Continued from page 28)

This is unfortunate, because all private pilots should be concerned with the subject of *fast turns or tight turns.* Improper technique in turning fast at slow speeds, or in trying to "tighten" a turn, has caused many an unintentional spin. When these spins are performed at low altitude a crash results.

You should be able to score 100 per cent on the six questions above. The answers are quickly determined, and the results easy to prove in a plane.

(1) *Do all planes in the same bank turn equally fast?*

NO. This is fairly obvious if one pauses to consider what happens in a turn. If a plane is banked at 45°, and is flying at 100 m.p.h., it is making a nice, easy circle. Its turn is affected by its speed, its angle of bank, centrifugal force, and mass-gravity. What happens if the speed is increased to 200 m.p.h.?

The answer may be rationalized if the reader will tie a weight to a piece of string and whirl the weight around his index finger. It is easy to feel the centrifugal force as the weight pulls outward. Now permit the string to wrap itself around the index finger, keeping the centrifugal force always the same. What happens? The weight whirls with ever-increasing rate of rotation. It makes more turns per second than when the string was longer. In other words, angular momentum is conserved, or equal areas are being swept out in equal intervals of time. At this point we begin to suspect that a weight on a longer string, travelling faster, could sweep out the same area even if it didn't complete as many turns as the shorter string.

Next, with the same length of string and the same weight, whirl the weight faster. Notice that centrifugal force increases, and that the weight rides higher, just as if the angle of bank were increased.

Make still another test. Tie a second weight to the string, say a quarter of the way from the finger to the first weight. Whirl both weights, thereby making the rate of rotation the same for each. *Something* must change, because the outside weight is travelling faster linearly than the inside weight. What happens? The surprising thing is that the outside weight rides higher in the turn, bending the string upwards!

Consider Figure 1, in which a plane is banked at 45°. The vertical line represents mass-gravity, while the oblique line is the lift necessary for level flight. The horizontal line is centrifugal force. Notice that speed does not enter the discussion in any manner! We need just enough lift to overcome gravity and centrifugal force.

Going back to our original question, suppose we take a plane in a 45° bank, flying at 100 m.p.h., and with the following four factors to be considered: (a) angle of bank —fixed at 45°; (b) speed — fixed at 100 m.p.h.; (c) mass—fixed by weight of plane and gravity; (d) centrifugal force—fixed by proposition and Fig. 1; (e) rate of turn.

Obviously, the only factor that can change is the rate of turn! It is apparent that a plane flying at 100 m.p.h. and making an easy turn over the airport could turn with less strain than a plane flying in the same radius at 200, or 600 m.p.h. But what happens? What changes? Which plane flies a smaller circle? The answer, from our experiment, must be: the slower plane turns faster.

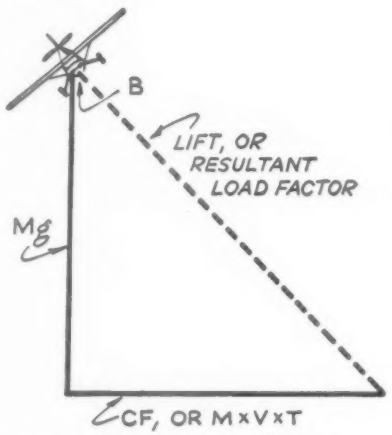

Fig. 1. Tangent of angle of bank "B" is equal to MVT/Mg. In this case (45°) it is equal to unity or to one, in other words.

For those interested, an accurate solution is given in a few simple mathematical formulae.

From Figure 1 it may be seen that centrifugal force equals mass, times velocity, times rate of turn. Let's write it this way,

$$CF = M \times V \times T$$

Also, from Figure 1, we see that the tangent of angle of bank is the opposite side over the adjacent side, and we can write the tangent as "1" because the bank is 45°. So,

$$1 = \frac{M \times V \times T}{M \times G}$$

$$1 = \frac{V \times T}{G}$$

(where G is 32.2 feet per second, the acceleration of gravity).

$$T = \frac{32.2}{V}$$

Therefore, the *rate of turn* depends solely upon the speed, and the higher the speed, or value of "V", the less is the value of "T", our rate of turn! For any plane in a 45° bank, we can solve for the number of seconds it would take to complete a turn at any air speed, in this manner: (for 100 m.p.h.):

$$100 \text{ m.p.h.} = 146.6 \text{ ft./sec.}$$

$$T = \frac{32.2}{146.6} = .22 \text{ radian/sec.}$$

As there are 57.3° per radian, .22 x 57.3= 12.6° per second. In 28 1/2 seconds (360/12.6) the plane would fly through a complete circle, or 360°.

How long would it take a plane flying at 200 m.p.h. to make a complete circle? Obviously, twice as long, or 57 seconds. But something is very confusing about this answer, because this plane is flying *twice as fast,* and takes *twice as long* to circle the airport. How is that possible?

Going back to our weight-on-a-string illustration, we know that in order to keep centrifugal force constant, we must change either mass, velocity or rate of turn. But we know the mass is unchanged, and the speed is doubled. The only way that we can lower the rate of turn is to lengthen the string. The question is, how much? If we pay out twice as much string the weight will get around the circle in exactly the same time as the shorter, slower weight and string. We find, too, that in this case the weight will rise in height and that CF will increase. Only when we have four times the length of string as before does the centrifugal force remain the same as in the first experiment. Mathematically, it is easy:

Figure 2 shows how rate of turn is measured. Rate of turn may be defined as the velocity divided by the radius. Written thus:

$$\text{Rate of turn } (T) = \frac{\text{Velocity}}{\text{Radius}}$$

If we substitute this in the equation,

$$T = \frac{32.2}{V}, \text{ we obtain}$$

$$\frac{V}{r} = \frac{32.2}{V}, \text{ or}$$

$$\text{Radius} = \frac{V^2}{32.2}$$

Thus it may be seen that the radius varies as the *square of the speed.* At 100 m.p.h. the circumference would be approximately 4,200 feet, while at 200 m.p.h. it would be 16,800 feet. Does this check with our previous computation?

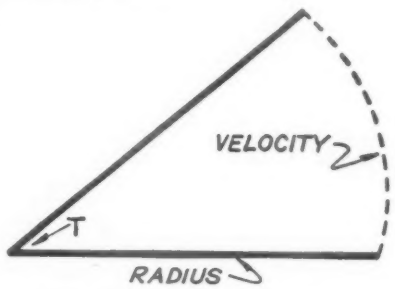

Fig. 2. Rate of turn (measured by angle "T") equals velocity divided by radius.

We figured it would take 28 1/2 seconds to complete the turn. At 100 m.p.h. we cover 146.7 ft./sec. In 28 1/2 seconds we would fly approximately 4,200 feet—which checks.

From the foregoing it may be stated that all planes do *not* turn at the same rate, even if they are banked the same, but that, as a matter of fact, the faster the *airspeed,* the slower they turn.

2. *Which affects the turn more, increased speed or increased bank?*

Obviously, increased bank. To increase the speed merely slows the turn. Here are some figures which were computed from the formula just given:

	100 m.p.h. plane	*200 m.p.h. plane*
20° bank	79″ for 360° turn	158″ for 360° turn
45° bank	29 ″ ″	57 ″ ″
60° bank	17 ″ ″	33 ″ ″
80° bank	5 ″ ″	10 ″ ″

Thus it may be seen that it is bank which is so important. Doubling the speed makes

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the turn take twice as long, while doubling the angle of bank more than doubles the rate of turn.

This information should be of considerable value to the private pilot, inasmuch as he should remember not to yield to the temptation to turn quickly. The airplane will turn more quickly as the bank increases, but the load factor (G's) and the stalling speed go up even faster. See Figure 3.

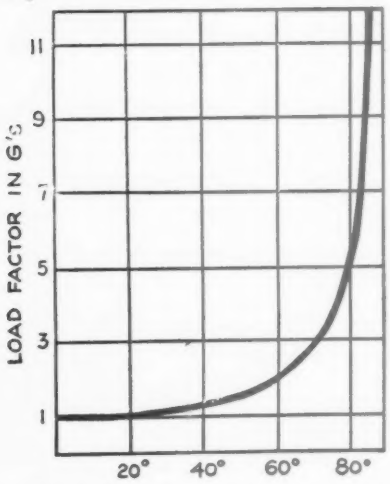

Fig. 3. Planes turn more quickly as the bank increases, but load factor shoots up.

3. *Which can turn in a smaller circle, a slow plane or a fast plane?*

A slow plane can turn more quickly, bank for bank, than a fast plane. A fast plane may have more power, however, with which to hold a steep bank; in that case, it would be able to turn more quickly by banking steeper. In any case, load factor limits the turn, and Figure 3 must be remembered.

4. *Is it possible to tighten a turn?*

This is a kind of catch question. There is no such thing as *tightening the turn.* The fallacy of a tightened turn has been bandied about so much that it is common to talk about "pulling back on the stick and tightening the turn."

What actually happens is this. The pilot starts his turn in the normal manner, banking over to his desired bank, say 45°. As back-stick pressure is required to maintain altitude and to compensate for the higher effective weight caused by centrifugal force, the pilot soon becomes accustomed to holding the plane up by this method.

As should be apparent from the foregoing discussion, there is one rate of turn, and one rate only, for a given airspeed and a given angle of bank. It is impossible to "tighten" the turn, as will be obvious if we will go back to our string and weight illustration. The moment we whirl the weight faster, it rises higher, which is the same as increasing the angle of bank. Or, if we bring the weight in by shortening the string, it will automatically whirl faster with the same amount of centrifugal force, comparatively speaking. Centrifugal force depends upon mass, speed and rate of turn. Rate of turn equals speed divided by radius of turn. Both mathematics and experiment prove this.

If we don't tighten the turn, how do we turn shorter, or tighter? The answer is: we must (1) slow down, or (2) we must bank more steeply.

That may be all very true, some pilots will argue, but *I know* I have pulled back on the stick and tightened my turn, many times. What is the answer to that?

The answer is to examine the sequence again. First, the pilot pulled back on the stick, so the angle of attack increased and the plane climbed. Then, because of the climb and increased drag, speed was lost. Finally, because of decreased speed, the radius of the turn became smaller, or, as common parlance has it, the turn "tightened." *Tightened* is a poor term to use, because we can't really tighten a turn: we turn shorter by turning in a smaller radius, because of decreased speed, increased bank, or both.

5. *If a needle-width turn permits all planes at any speed to make a turn in two minutes, does it follow that rate of turn depends upon bank alone?*

NO. In fact, just the reverse. A rate-of-turn indicator is a rate instrument. A pilot flies the plane to adjust the instrument. The instrument does not adjust the plane. The instrument merely indicates what is happening.

Why does the plane turn in two minutes, then, regardless of airspeed? Simply because the pilot keeps on banking until his plane is banked steeply enough to enable it to turn through 360° in two minutes. The amount of bank required varies with the airspeed.

This information should be of value to private and commercial pilots who have instrument ratings. Suppose you are flying a 75 m.p.h. plane on instruments, and execute a two-minute turn. Your bank will be 10°. This is such a gentle bank that almost no back pressure will be required to maintain altitude. Now suppose you land and take off later in a 225 m.p.h. plane, fly on instruments, and make a timed two-minute turn. The angle of bank will be almost 30°.

Steep banks require considerable back pressure in order to maintain altitude. There is considerable difference between the back pressure which is necessary in an instrument turn at high speed, and the back pressure in a turn at low speed, but not because of the speed! It is because a higher bank is necessary in order to fly through 360° in two minutes. But the difference in back pressure is confusing, nevertheless.

In fact, use of back pressure is confusing in entering the turn and in leaving the turn, when the pilot may feel he is descending and try to keep on holding back pressure. This can, and has, resulted in stalls and "grave-yard" spirals.

6. *Some pilots claim that to increase the angle of attack increases the lift. But planes in a fast turn sometimes slow down and stall, or lose altitude. Therefore, does increasing the angle of attack really increase the lift?*

YES. But it also increases the drag. Many pilots making steep turns do not really understand all that happens in a turn. Some pilots believe that the steepest turn is made by manhandling the airplane, forcing it over steeper and steeper, and "horsing" back on the stick and holding the plane in the turn by sheer force. Sooner or later the plane shudders, stalls, and falls off, and the pilot has to start all over again.

What should be understood is this: there is a design speed for the engine and propeller. At a certain speed and a given number of r.p.m.'s, the engine and propeller furnish the maximum horsepower. It is power that enables a pilot to make a steep turn, and this power must overcome the effect of gravity, drag, and centrifugal force. With maximum power output, the plane may be banked only to a certain angle and still maintain level flight.

Suppose the speed for maximum power output is between 65 and 70 m.p.h. Then the steepest turn will be possible at this speed, as there is sufficient power to permit an angle of attack that will yield the maximum lift.

Many pilots fallaciously believe that after the airplane is banked and back-pressure is applied, the plane stalls because *no lift* was obtained from increasing the angle of attack. Not so! The stall resulted from (1) increasing the bank (2) increasing the angle of attack (3) increasing the drag (4) slowing the plane down below the rated maximum power output specifications. In other words, if your engine lacks horsepower to permit a bank of 45°, it cannot and will not maintain both bank and altitude no matter how much back-pressure is applied on the stick.

Finally, what will it be, fast turns or tight turns? If the term "tight turn" is here to stay, and it probably is, pilots should remember that the tighter the turn the closer one is to the stalling point. If fast turn and tight turn are going to be synonymous, remember this: *any* plane turns faster when it is banked steeper, and the slower it flies the faster it can turn, but in any case, to "tighten" the turn is dangerous. END.

This Is Private Flying

(Continued from page 33)

to work on the ship. He did a careful job of taking out the instrument and checking the lines to be sure that they were clear. He fooled around for half an hour before he discovered how to take the instrument apart, and admitted before he started that he had never seen one before.

When he got it open, he found that it was full of oil and aluminum filings. I think that the filings came from the holding screws, too long, which had cut into the side of the case. He straightened a release lever that was cocked, cleaned, and re-oiled the instrument. He then hooked it to a pitot line and checked it against some fancy mercury gauge which showed that it started right at 45 m.p.h. After he had reinstalled it in the plane, it worked fine, but I believe it should have another hand on it to give it more than a 60-minute reading.

My man spent about four hours on it and charged me for three, at $2.50 per. Not bad, not bad at all.

Sloppy work came up to haunt me when I landed at Teterboro Airport, across from New York City in the Jersey Flats, after taking off from Hybla. I arrived about mid-afternoon and was told at the Raush Han-

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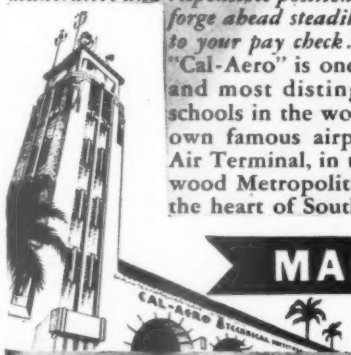

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gar that I could get a 100-hour check promptly if I wanted to pay for overtime after 4:30; otherwise they would complete the job in the morning. I elected the latter. I heard the boss tell the mech to give my engine a "good" check and then he turned to me and got me a room in one of the cleanest tourist homes, nearby, that I have ever seen.

As I left I saw the mech tie the plane down after finishing his work on it for that day, and when I got back to the field the next morning at 8.30, he was just finishing the job.

I found that they had worked about four hours, but allowed for time-offs to service gas customers, charging me for only two. They didn't wash the engine down till I asked for it, put the cowlings back on dirty and, when they did wash the engine, let the dirty solvent run down into the belly, leaving a mess. To make matters worse, the ramp at the field was being graded, and dust and dew had messed up the plane itself, about which they did nothing.

After paying for the job, I took off and landed at Morristown, where I crossed all the wires on one magneto before taxiing up to Dutton Hangar. A mechanic there, after a minimum of testing, straightened the wires out. I also got a good wash job at this airport—2½ hours of good, thorough cleaning work, price $6.

Things were as good or better at the next stop, Westchester, where the service began to shine while I was in the traffic pattern. I have never had such courtesy from any tower on any field, nor have I been able to read any tower so clearly. The tower is on the same frequency as the marker beacon there, which is bad when the tower is not talking to you. When the tower is talking, however, the marker beacon "D" signal is cut out.

On the ground I found everything neat as a pin, and everybody courteous. I asked somebody at the gas truck about a mech, and was personally conducted to the hangar boss, who filled out a work order when I said I wanted the idling adjusted. I also asked them to see where the excess gas was coming from.

The mechanic found the primer opened (my doings), and said so. He had wasted a few moves first looking for a broken line, but refused to charge me for the job. I tipped him 50 cents, but when we got into the hangar the boss said there was a $1 charge. They did not want to charge me on this when they found out how simple it was, but they had already made out a work order on it and $1 was the minimum charge in such cases. Ah, red tape is not always confined to Government.

This field also has a minimum landing fee of $1.50 for small ships, up to $25 for DC-4s, but you cancel this out if you get service or gas to that amount. The $1.50 includes services—tie-down, two checks during the night, and a constant patrol by armed state guards. They're good, too. I neglected to register when I landed and one of them blocked my take-off with a jeep till he'd made sure I wasn't swiping a plane. All plane owners get a field pass, normally, as soon as they land.

I touched down at Norfolk, heading south. The service is very good and already familiar to me, in contrast to the cleanliness of the washrooms, which is way below par.

At Greenville, I opened the primer, something that the mech discovered quickly and fixed without charge, cutting the time of my arrival at Rose Hill, where the weather forced me to land. I didn't play around with the mechanics at this field, but can report that I experienced some real Southern hospitality when I put up at a private home, no hotel being available.

I did catch up with some sloppy work that had been done at Teterboro, however. I had been getting a lot of extra noise from the radio. I blamed the engine spark plugs. On removing them, I found that the mech had put them in with some kind of grease that burnt in. We had to use an 18-inch extension on the socket and a hammer to pry them loose. Why it did not take out the inserts I'll never know. It took another hour or so to pry all the burnt stuff out of the threads and we had to sand blast the gaskets off. We then checked the gaps and found them to be over .025 (they should be set from .014 to .018). After resetting them we found that we got very little radio interference.

I say "we"—a very careful mech who had been an artillery liaison mechanic during the war worked with me. He had worked on plane engines before the war and his experience showed in the kind of a job he did with me. The bill was good, too. We spent over seven hours on the job but I was charged for only six. Even better, it was at $2.25 per hour, the lowest yet on my tour.

The service was as good at Charlotte, N. C., my next stop, where I was followed around so faithfully by a gas man, that I didn't have an opportunity to jimmy up anything on the plane. I landed next at Spartanburg, and this time managed to remove a steerable spring from the tail wheel, as I had hoped to do at Charlotte. But it wasn't my day for testing, apparently, for the first person I ran into was "Pappy" Rinehart, whose ship I used to service and who has known me as an A. & E. mech for years. I would have had about as much chance putting on a test show with him around as flying a piece of beaverboard, so on to Greenville, where I found the service slowed to a southern walk.

I taxied up to the main hangar at Greenville and waited for someone to move an Aeronca that was in my way. After about three minutes a student who was "resting" against the hangar moved the plane and I taxied up. I sat three minuets more. No service. Then I got out and stood beside the plane for eight minutes, waiting.

I decided to see if I could smoke somebody out, as I lighted a cigarette in defiance of the "No Smoking" sign. Several mechanics walking back and forth across the hangar glanced at me from time to time, but no one came to help me. Finally I made up my mind to give it up, so I got back into the plane, intending to park it myself. Just before I started the engine I heard

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someone say from the office, "I guess that guy at the gas pit got tired of waiting."

The next morning I got the same treatment. During flight my ailerons had trailed about an inch above the wing and I asked them to tighten the cables. The foreman set the stick in neutral, looked at the ailerons, and left it. I waited around for someone to work on the plane and after an hour or more I asked the foreman what about it? He said: "My gosh, we fixed that over an hour ago. Didn't someone tell you?"

In flight my ailerons still trailed about an inch above the wing, and I let it ride. Obviously, no one had touched this plane except to set the controls in neutral.

I don't mean to imply that this is typically Southern service, because when I got to Atlanta the service was way back up above par, no watching needed. I went to visit the CAA boys at the field, and when I came back found three boys around the Luscombe, one vacuuming the rug, one cleaning the windows inside, the third cleaning them outside. They had been cleaned at Rose Hill, so weren't very dirty, but they got cleaned anyhow. I spoke to them about the loose cables and they got a mechanic on the double quick. He bent the tab to fix the one that rode higher than the other, no charge, glad you dropped in. This was excellent service by the Cessna dealer at the northeast end of the field.

I opened the primer again before landing at Selma, Ala., but the licensed mechanic was in town and although the line boy brought out a lot of tools and tried hard, he didn't get near the trouble. I had to fix the primer myself before the take-off. The line boy had a hard time making up his mind what to charge me, but finally settled for 50 cents. I figured he earned it, even if he didn't do anything constructive. At least he'd done no damage.

Probably the climax of my trip through the south was at Jackson, Miss. No one came out to direct me when I landed at the municipal airport so I opened the cowl and crossed two plug wires. I told the manager I didn't like the sound of my engine, but he had no mechanics available and referred me to neighboring Rankin Field, which he recommended highly. I flew over on the left magneto and as I taxied up the mechanic listened to me and said it sounded like points.

Here is what this over-hasty diagnosis resulted in: He removed the magneto, looked it all over, then removed the rear case, looked it over, replaced the case, and in so doing messed up the internal timing. Thereafter it was entirely dead. Then the boss came out and the two of them took it out again, checked and rechecked it, reinstalled it, checked switch lines, changed plugs, removed the magneto again, and so on. Of course the second man couldn't know that the internal timing was off by this time.

They tried a different condenser, took the magneto down again, tried a different coil, tried out half a magneto they had there, and it wouldn't work at all. Two men worked all day on this magneto and two others worked on it part of the time. They mixed up the parts of their magneto and mine so that it was impossible to know which was which. I lost track of how many times the magneto was off.

The next morning they took the magneto and wires down town to a regular magneto shop. The mechanic who brought it back said they had discovered that a nut was loose on the front of the magneto and that it caused the rotor to touch the field, thereby grounding out the magneto. This time the magneto worked, because, of course, in replacing the wires they had to retrace them correctly.

Now was there anything wrong with the magneto? I don't honestly know—but I do know that it was working fine until I crossed the wires. The mechanics at the airport had tried conscientiously to find the trouble and no doubt they are competent workmen, but they got started on the wrong trail and they were a long time finding their way back home.

FLYING

"I represent the Confederated Air Lines. You'll have to stop throwing your rubbish out the windows between 8 a.m. and 4 p.m."

I wasn't far from my destination at the Luscombe factory in Dallas by this time. I stopped at a number of other airports on the way in, and I got excellent service at Mineola, Tex. Then I took off for Dallas and the Luscombe field. I arrived there with a very red face—I landed on the field almost hard enough to wash out the gear. Jim Camp, the sales manager, assured me that they were building downdrafts very close to the ground in Texas these days, and everyone was setting them down hard.

We then checked the plane thoroughly to see what 10,000 miles and 100 different airport operators had done for it.

During my two-month tour, I had bought 590.4 gallons of gasoline which cost me $172.62. But aside from depreciation of the airplane, and cost of oil and insurance, this is not all the expense of making a round trip circuit of the country. I had started out with a new plane which had only a half hour of time on it.

It was in excellent operating shape when I brought it back. But the variety of mechanics who had worked on it had probably caused more damage than the normal wear and tear of flying 10,000 miles. Most of the things that had to be done to this plane were the result of damage at the hands of careless or unskilled maintenance men.

The propeller had been removed and replaced so many times that the metal ring had cut into the wood hub. There was water in the fuel system from a careless gasoline operation somewhere. There was an inside nut loose on the right magneto. A poor safety job had been performed on the oil screen and drain. There had been a poor safety job on the elevator cable. The filler necks on the gas tanks had been bent by gas hose nozzles. The set screw on the idling stop had been twisted off. The left wing tip was nicked and there were scratches on the metal and paint on the underside of the right wing tip. The front of the cowling was dented and scratched because of improper replacement at Tacoma, Wash. We also found excessive oil and dirt in the belly—including aluminum filings which we had purposely left there to see if anyone would clean them out. These should have been removed at the 100-hour inspections.

Besides these things, all of them the result of poor maintenance, we found a number of other matters that required repair or modification. A plug had come out of the intake manifold during flight. The door knobs were loose and the Plexiglas on the right door had cracked. We also found excessive weather checking in the rubber hose of the oil pressure line and the crankcase breather line. The compass, too, had proved to be inaccurate because of its location in relation to the magnetic tachometer.

In addition, the cowlings of this particular plane had been located too far aft and too tight, causing wear from vibration. Several instances where tightness caused interference, or vibration showed wear, are being altered in the design.

Other than this, the Luscombe carried me over 10,000 miles in two months with complete dependability and with great economy. I never had a bit of trouble with it save the one time the plug came out of the intake manifold over Benson, Ariz. This could have been serious, since the engine would cut out at anything except wide open throttle.

But the plane did not receive the quality of maintenance it deserved at many places. Operators who expect to sell more planes and keep on serving them at their airports, must improve the quality of their personnel. Undoubtedly most of the A. & E.'s I met up with on my trip are thoroughly competent men. But one bad job by an incompetent man is enough to drive some pilots away from private flying—or even to risk that pilot's life. A. & E. mechanics should be like physicians in their responsibilities to their customers. END

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THE NAME MEN FLY BY

Blackjacking the Pilot

(Continued from page 18)

Approaching the field, Vos called the tower from about five miles out, at which point he had the field in sight. He was unable to read the tower from that distance, but getting in closer he could hear the tower reporting a Culver at his approximate position. He called the tower again and was given landing instructions and landing clearance. After landing, the tower man cleared him to a hangar and asked him to phone the tower. He did this and was asked his identification.

For a seemingly routine flight, during which Vos followed the weather advice of the Moline weather office and exercised good judgment in not landing at Lakeside Airport, this pilot, like many others, was charged with a number of CAR violations.

On July 30, more than five weeks after his flight, Vos received a registered letter from C. Z. German, regional attorney of the CAA, advising him that on June 23 he had operated a plane in the vicinity of and landed at Municipal Airport, St. Louis, under instrument weather conditions, when he had not filed a flight plan, had not obtained a traffic clearance, and did not hold an instrument rating. Accordingly he had violated four sections of the Civil Air Regulations and Section 610 (a) of the Civil Aeronautics Act.

He was liable for $1,000 penalties for each of the first four violations, he was sweetly informed; however, the CAA indicated it might consider a compromise settlement of $100. If Vos did not wish to accept that, he could have the case decided in U. S. District Court.

Vos immediately wrote to German and outlined the circumstances of his flight, as explained above, in the belief that these would excuse any violations he had unwittingly made. German wrote him September 23 stating that according to official weather reports, St. Louis had instrument weather conditions at the time Vos was in Moline, and that the weather continued to lower. "Your explanation, therefore, does not appear to contain any mitigating circumstances," German stated.

"Unless I hear from you on or before October 1, 1947, with regard to an offer to compromise, as suggested in my letter of July 30, it will be necessary for me to refer this matter to the Department of Justice for further action."

Vos wrote German requesting his "cooperation in pointing out to me where I made the wrong decision, and what I should have done instead." He never received an answer.

Vos immediately appealed to the Aircraft Owners and Pilots Association for aid and on the AOPA's advice finally made a compromise offer to settle the matter for $25, which was accepted by the CAA. However, the settlement will go on Vos' pilot record as a black mark.

This case is typical of hundreds that happen every year.

It is typical of the manner in which the CAA acts as prosecutor, judge and jury.

It is typical in that Vos was adjudged guilty on *ex parte* evidence without being given a trial or a hearing, or a chance to defend himself before a judge. While Vos had the legal alternative of fighting the case in Federal Court, in practice such a suit would cost him hundreds, perhaps thousands of dollars. It is also typical in that, from his viewpoint, he had violated no regulation, and that if a violation occurred it was at most a technical one.

In the last six months of 1947, 1,800 similar cases were filed with the Civil Aeronautics Administration—so many that CAA is two months behind in handling its share of them, and the CAB, which handles cases where the competency of the pilots is questioned, is a full year behind.

The tremendous volume of such complaints, and the great backlogs which have been built up, have resulted in a nasty situation for private flying which must somehow be cleared up.

There have been hundreds of "sandbagging" letters assessing civil penalties against alleged violators, and even containing the terrifying threat of intervention by the Department of Justice if the pilot doesn't pay.

Last May 4, John M. Jewett, Jr., a military pilot, was flying a young woman over Manhattan in a lightplane when his engine failed. Jewett dove his plane trying to windmill the propeller and restart the engine, without success. Still at a safe altitude, he looked about for a spot to make a forced landing. He had two alternatives: to land in the river, or to land on a stretch of the Henry Hudson Parkway which was free of automobile traffic at the time. He decided that the river was too dangerous, and made a successful landing on the parkway under difficult circumstances.

A few days later he received a letter from S. W. Bobskill, CAA regional attorney, charging him with carrying a passenger over a congested area in New York City at an altitude of less than 1,000 feet (made necessary by the forced landing), and of executing dives over a congested area at less than 1,000 feet (done in an effort to re-start his engine) when the occupants were not equipped with parachutes, with landing on the Henry Hudson Parkway and by such action operating his plane in "a careless and reckless manner so as to endanger the lives and property of others," and so on. He was accused of violating four sections of the CAR and one section of the Civil Aeronautics Act of 1938.

Bobskill's letter is typical:

"There are two means by which a civil penalty may be settled. The first is by trial in a U. S. District Court in which you have the right to submit evidence either showing that you did not commit the alleged violation or explaining and excusing the offense. If this method is elected, the case will be brought to the attention of the court through the filing of a suit by the United States (Department of Justice). The second method of settlement is through an offer by you to the Administrator to compromise the civil penalty in an amount which, in the opinion of the Administrator, appears reasonable in view of the circumstances surrounding the violation.

"The purpose of this letter is to advise you that the Administrator will consider accepting an offer to compromise any civil penalties resulting from these violations. If you submit to the Administrator, through this office, an offer to settle the civil penalty for the sum of $250, this office will recommend to the Administrator that it be accepted as a compromise settlement. Your offer should be accompanied by a certified check or money order payable to the Treasurer of the United States for that amount. If your offer is accepted by the Administrator, it will be in full satisfaction of the civil penalties arising out of the reported violations. . . .

"If we do not hear from you within 30 days after receipt of this letter, we will assume that you prefer to have the case

FLYING

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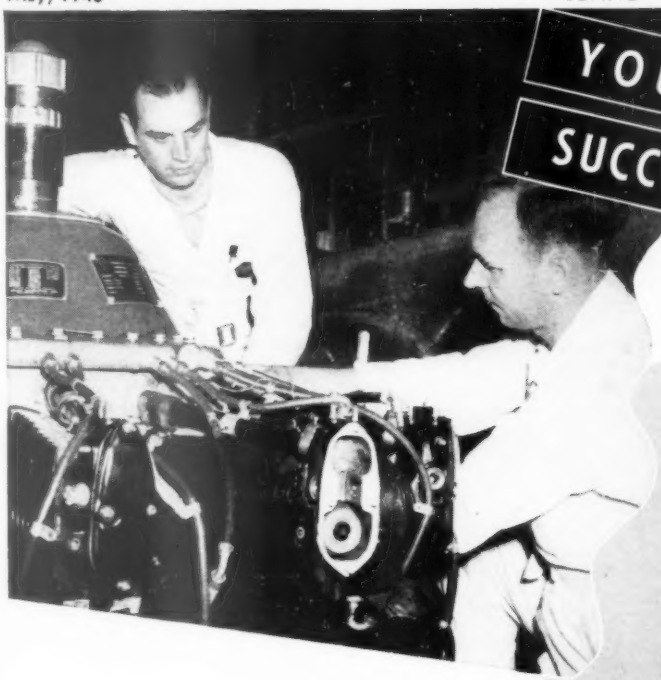

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Enrollment at Spartan is limited so each student may have full use of equipment and receive all necessary personal instruction. Classes are sometimes filled in advance. To be sure of acceptance, make your application at the earliest possible moment. *Write NOW for complete information!*

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decided by the Court and will institute a civil suit."

In addition to this persecution by a Government agency, Jewett was required to appear in New York City police court on criminal charges, and threatened with 30 days in prison plus a $50 fine. He had to hire an attorney to defend himself. The police case was finally dismissed.

But he didn't get off so easy with the Government. Jewett hired an attorney to defend himself against the CAA charges, but was finally unable to afford further legal action and paid a compromise "settlement fine" of $150.

It is important to note that even this might not have ended the matter. The CAB could have entered the case and suspended or revoked Jewett's pilot license.

AOPA Manager Hartranft feels that this action clearly violated the spirit of the CAR. "The only actual point at issue in this New York case was whether the pilot did or did not make a wise decision in landing on the parkway instead of in the river," he says.

"Note, however, how the book of Civil Air Regulations was used in an effort to incriminate this pilot under several unrelated technical CAR provisions which actually had little or no bearing on the case."

On what basis are these cafeteria court settlements permitted? What is the procedure for handling a case if you, for example, or any pilot you know, allegedly violated the Civil Air Regulations?

First of all, a complaint would be received in the regional CAA office. A CAA inspector might make a personal investigation, and he might talk with some of the complainants, but the chances are he would not talk with you. Each CAA office has a committee, usually consisting of the regional attorney and one or two safety employees. The inspector would report to the committee, and the committee would then decide what to do. Four types of action are possible.

1. A *complaint* is filed with the Civil Aeronautics Board, when the regional committee decides that the alleged incident shows incompetency. Any complaint filed with the Board gives it jurisdiction over the pilot's certificate. When the complaint is filed with the Board, the Board has authority to suspend or revoke the pilot's certificate. Few cases except those involving airline transport pilots, are considered by actual Board members, however. An estimated 85 per cent of them are decided by examiners who also act as judges. These examiners hold public hearings at which the pilot has an opportunity to testify and to bring in witnesses. The penalties are largely determined by Board policy—for instance, a standard penalty is revocation of licenses of students carrying passengers.

2. A *civil penalty* is sought if the alleged offenses are technical violations of the CAR and if competency of the pilot is not at issue. The Jewett case, described above, is a civil penalty case, and the procedure handled in that case is typical. In case the pilot fights the matter in the court, the regional CAA attorney can transmit the case directly to the regional Federal District Attorney—or the CAA can handle the

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William L. Brennand, of Oshkosh, Wis., winner of the Continental Motors Trophy at the Miami Air Maneuvers, is congratulated by C. J. Reese, president of Continental Motors Corp. Brennand attained a speed of nearly 200 m.p.h. in a Wittman Special powered by a Continental 85 h.p. engine

There's real sport, real thrill, in racing midget planes. Many of them are designed and built by the pilots themselves. Rules governing the construction of planes, established by the Professional Racing Pilots Association, specify engine displacement of 190 cu. in. or less. These same rules bar the use of super-chargers and other special equipment that would greatly increase the cost of building and flying a midget plane. The reliability and safety of midget racing planes was proved at Cleveland and Miami. Piloting a midget racer is a sport you'll want to investigate!

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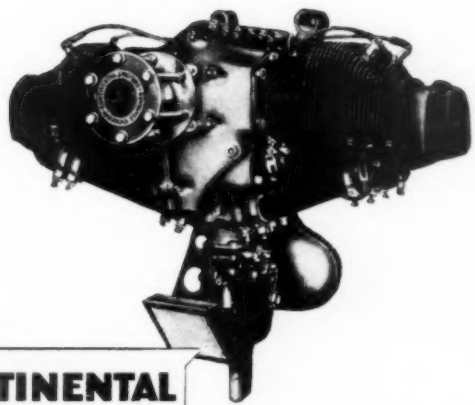

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case itself if the District Attorney desires. Comparatively few cases have had to be handled that way, but the Federal courts are so full that if any substantial number of pilots insisted on fighting through the courts, the dockets would probably be jammed for years.

3. A *reprimand* is given if the alleged violation is not deemed important enough to warrant a civil penalty.

4. Cases of which no other disposition is made (such as pilots being killed during violations) are *filed for record.*

The volume of complaints has increased enormously in recent months. There were only 1,300 cases in all of the fiscal year 1946, 1,800 in 1947, and 1,800 in the first six months of fiscal 1948. About 45 per cent of these are filed with the CAB as complaints. Another 45 per cent are retained by the CAA and a civil penalty is sought. The remaining 10 per cent of alleged violators are reprimanded, or their cases filed for record.

Robert P. Boyle, assistant chief counsel of the CAA, asserts that every effort is made to develop a uniform policy for handling cases, and that the basis for deciding on their disposition is determined by statute. The CAA in Washington post-audits all regional cases. It does not upset the regional attorney's findings, however; only sends him a report analyzing his actions. Every pilot is given a chance to make a personal statement and to come in and discuss his case in a civil penalty action.

"The most important job of the regional attorneys," he says, "is not enforcement but education. We are trying to prevent violations rather than to punish violators. That is the whole emphasis of our program."

On the CAB side, Merrill Armour, assistant chief examiner, safety enforcement proceedings division, admits that the 600-case backlog of his agency presents a difficult situation. "To me it's sad," he says. "It's disastrous for safety."

He is unable to proceed faster, he explains, because of lack of personnel. The Board has approved an adequate budget but the Civil Service Commission has proved a bottleneck. "Right now we have only four examiners and we need eight more. We have the budget appropriations for them, but we haven't been able to get the men."

Armour asserts that one reason for lack of uniform treatment of violators lies in the split authority between CAA and CAB. "The weakness in the present setup is that we don't handle the civil penalty cases also. That would make for uniformity. The present method subjects the certificate holder to arbitrary procedures."

One such arbitrary procedure is that pilots are subject to penalties by both CAA and CAB and in some cases have been penalized by both agencies. It is fundamental in U. S. law that no man can be tried twice for the same crime, yet men can be penalized twice under the legal pretext that one case is a "civil penalty." Thus, double penalties are not double jeopardy legally though they are in practice.

Armour has tended to be sympathetic toward pilots. Nevertheless, even the CAB has shown clear inconsistencies in its treatment of violators. In one case, two WTS instructors in Ohio, bored with the routine, each took off with a cadet from Clickinger Airport near Columbus and gave their planes a real wringing out. One was a married man with three children; the other was unmarried. The married man waived a hearing; the other man asked for a hearing. On the same set of facts, the Civil Aeronautics Board revoked the married man's instructor's rating and his commercial pilot certificate—thus preventing him from making a living in aviation. The unmarried man got only a 30-day suspension.

The delays inherent in the big backlog of cases may work serious hardships, as in the case of Ernest W. Condit. Condit allegedly violated the CAR as a student pilot, when he flew low over his own home in a comparatively uncongested area. Although he claimed that he was never below 500 feet, Condit was asked to come into the CAA office, was reprimanded, and asked to make out a complete report of what he had done.

The alleged offense occurred in the late summer of 1945. Meanwhile Condit continued his air training, got his private pilot license, bought a BT-13A and built up a substantial flower delivery business. He advertised the use of his plane to fly fresh flowers between the markets and his own floral shop. Then a year after the alleged violation, Condit received a letter from the CAB ordering his suspension for 90 days. If the suspension had gone into effect, it is clear that Condit's flower business would have been seriously damaged. With AOPA help, he finally settled the matter with payment of a $100 settlement and the suspension order was waived.

If the suspension order had been enforced a year after the violation, the delay would have caused him far more damage than if it had been enforced against him as a student pilot. Yet he was in no way responsible for the delay, and fortunately the CAB was persuaded to see the injustice of suspending him at the later date.

In Washington recently, I sat down with four ex-CAB examiners, now employed by the Department of Labor. All four unburdened themselves on what they feel is wrong with the CAA-CAB enforcement setup. They are Donald M. Davis, former assistant chief of the safety section and present secretary of the Federal Conference of Trial Examiners; James V. Constantine, Ellison D. Smith, and Sanfjord B. Teu II, one-time regional attorney. Both Constantine and Teu were also at one time on the CAA general counsel staff.

These men concede that some CAA attorneys are "over-zealous" and have a prosecutor complex. They believe that a single tribunal should be responsible for all violations and that that agency should be the CAB rather than the CAA—though an independent safety board might be still better.

Davis asserted that "it is contemptible the way some defendants may be forced to face two different tribunals." He cited the case of one man who was assessed a civil penalty of $500 by the CAA, revocation of his flight instructor rating by the CAB, and in effect was put out of business.

"The CAA is understaffed and underpaid and not always sympathetic," he says. "As for the CAB, safety is its stepchild. They're too interested in economic matters to be concerned about it. With the exception of Josh Lee, the board members never see these cases. They're mostly passed on by assistants."

They deny that there is really a written policy on whether cases should be referred for civil penalties or turned over to the CAB. "Actually there are nine different kinds of enforcement determined by the whims of the nine regional administrators. It is not the regional attorneys who are mainly responsible."

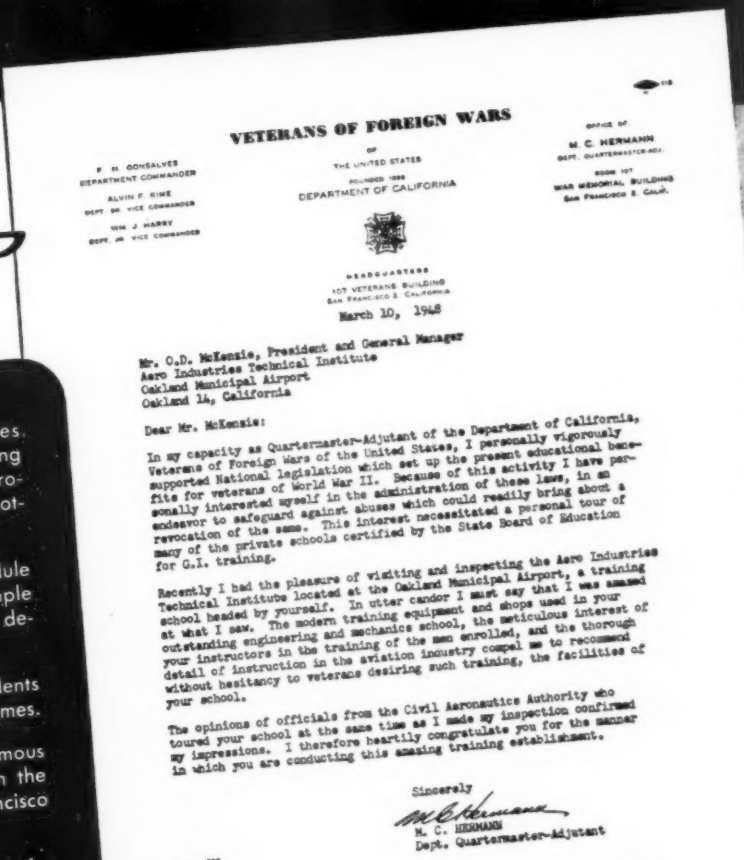
The whole field of aeronautical safety law, they agree, is very much up in the air. There are few precedents. The CAB is really making the law by its decisions.

The Department of Justice is reluctant to prosecute civil penalty cases turned over to it by the CAA. Apparently Justice feels that it should not be turned into a collection agency, especially when it sometimes

FLYING

"Remember, not over 500 m.p.h. for the first 1,000 miles."

THANK YOU!



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San Francisco 2, California

March 10, 1948

Mr. O.D. McKenzie, President and General Manager
Aero Industries Technical Institute
Oakland Municipal Airport
Oakland 14, California

Dear Mr. McKenzie:

In my capacity as Quartermaster-Adjutant of the Department of California, Veterans of Foreign Wars of the United States, I personally vigorously supported National legislation which set up the present educational benefits for veterans of World War II. Because of this activity I have personally interested myself in the administration of these laws, in an endeavor to safeguard against abuses which could readily bring about a revocation of the same. This interest necessitated a personal tour of many of the private schools certified by the State Board of Education for G.I. training.

Recently I had the pleasure of visiting and inspecting the Aero Industries Technical Institute located at the Oakland Municipal Airport, a training school headed by yourself. In utter candor I must say that I was amazed at what I saw. The modern training equipment and shops used in your outstanding engineering and mechanics school, the meticulous interest of your instructors in the training of the men enrolled, and the thorough detail of instruction in the aviation industry compel me to recommend without hesitancy to veterans desiring such training, the facilities of your school.

The opinions of officials from the Civil Aeronautics Authority who toured your school at the same time as I made my inspection confirmed my impressions. I therefore heartily congratulate you for the manner in which you are conducting this amazing training establishment.

Sincerely

M. C. HERMANN
Dept. Quartermaster-Adjutant

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MARCEL C. HERMANN

Marcel C. Hermann is a veteran of World War I, having served with the 27th Infantry in the capacity of Regimental Sergeant Major with the Siberian Expeditionary Forces. For twenty years he has been actively engaged in the work of veteran organizations, and for the past ten years has served as Quartermaster-Adjutant of the Department of California, Veterans of Foreign Wars of the United States. His interest in veterans, and his forceful prosecution of legislation for veteran benefits is known nationally.

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AIRviews

Opening up before us—air carriers and aircraft manufacturers alike—is a great revenue potential that has been slow in developing.

I'm speaking, of course, of the future in air cargo, as contrasted with passenger revenue. Only since the war have the vast opportunities in this field been approached realistically. There is still a long way to go.

Even today, for example, 95% of the revenue of all U. S. air transportation companies comes from carrying passengers; only 5% from freight. Contrast this with rail transportation, which gets 18% of its total revenue from passengers and 82% from freight!

Naturally, the flying of passengers will always remain a vital and glamorous part of our aviation picture. But there is reason to believe that the flying of cargo offers far more dollars and cents return.

What seems called for now is more careful over-all planning toward the successful handling of air cargo, and a long-range program for selling this service to management.

Cargo compartments of passenger planes and converted passenger planes must be replaced with aircraft specifically designed to handle cargo. Standard methods of tying down and loading and unloading must be devised. And fair rates established on a competitive basis.

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has to spend $1,500 to $2,000 to collect a judgment for a few hundred dollars.

Their opinions, plus other information presented here, points clearly to the need for a house cleaning in the CAA-CAB enforcement picture. The sincere efforts of most CAA and CAB enforcement personnel tends to be nullified by a small group of die-hards with a prosecutor complex. More important, the fundamental setup seems to be wrong.

Authority and administration are split between CAA and CAB. It would seem far better to have it centered in one agency—probably the CAB.

But even here there are objections. Though both CAA and CAB are about 600 cases behind, in terms of time the CAA is only about two months behind while the CAB is a year behind. The CAB is also preoccupied with the economic and safety affairs of the airlines. It is not especially interested in nor does it have time for other safety enforcement.

Again the answer seems to point toward a new Government agency exclusively concerned with aviation safety, such as the former Air Safety Board. The President's Air Policy Commission also recommended establishment of such a board.

Until the trouble is remedied somehow, pilots will still be kicked around and private flying will be laboring under one additional handicap. END

The Great Smokies

(Continued from page 34)

version of the great outdoors, packaged for wide-eyed urbanites. It's the real stuff, with only a few sharp edges of inconvenience shaved away. The 440,000 acres have a large number of bears, some tame enough to stage "holdups" for food when travelers approach. There are wild turkeys, deer, grouse, squirrels, opossums, raccoons and more than 50 species of fur-bearing animals, some 200 kinds of birds, 34 types of reptiles and 36 amphibians. Sixteen of the peaks within the park are over 6,000 feet high—which is one of the reasons it's best to tie down that plane at one of the region's airfields and make the actual survey on *terra firma*.

For fishing within the Park, you'll need either a North Carolina or Tennessee license, depending on the section you visit. North Carolina non-resident annual fee is $6.10 ($2.60 for a five-day permit), and Tennessee non-resident annual fee is $5 ($1 for a three-day permit).

In addition to free campgrounds within the Park, tourists can stay at LeConte Lodge on top of Mount LeConte (accessible only by foot or on horseback) and at Wonderland Hotel, Elkmont, Tenn. Rates range from $3 per day at LeConte (in a cabin without bath or running water) to $7 per day for a double-room with bath at the hotel.

The park itself is not the only attraction. Immediately south are the Qualla Reservation of the Cherokee Indians and Fontana Village on Fontana Lake. Tributaries of the Tellico River in the Cherokee reservation are declared by Federal authorities to be the best trout streams in eastern America.

Fontana Dam (largest of the TVA system) backs waters of the Little Tennessee River for 30 miles to create Fontana Lake, with a shoreline 218 miles long. Leaving your plane at such airports as Andrews-Murphy Air Park, Andrews, N. C. (about 30 miles away), you can get connections to Fontana Village. Because of its convenient location near the Park, good fishing streams and the lake, the village is a center for local activity: motor boating, fishing, mountain climbing, horseback riding, miniature golf, tennis, and softball. Over 300 modern cottages are available (rates range from about $5 per day for a trailer cabin to about $12 for a three-bedroom cottage).

Incidentally, the Andrews-Murphy Air Park is about 30 minutes by light-plane from Knoxville, Tenn., and is one of the closest airports to the central park area. Diagonally to the rear of the hangar, a swimming pool is under construction and should be open by this summer. E. A. Wood, Jr., the operator, reports that his field is only 39 miles by paved road from the Qualla reservation; 59 miles from Clingman's Dome, crest of the Great Smokies; and about 30 miles from Hiwassee, Fontana, Cheoah, Santeetlah, Nantahala, Chatuge, Nottely and Apalachia lakes.

At the eastern end of Fontana Lake is another tourist "headquarters," with Sylva Airport (Sylva, N. C.) only about 25 miles away. At Bryson City, guides and boats are available and accommodations are relatively inexpensive, ranging from about $3 up. The town has two hotels, nine motor courts, four tourist "farms," and about 23 tourist homes. From here, the flyer can fish on the lake and take regularly-scheduled sightseeing trips down the lake as far as Fontana. Bass fishing is best during April, May, June, October and November—but there is no closed season. The lake is also well-stocked with bream and trout.

On the Tennessee side of the border, closest town to the Park is Gatlinburg, where park headquarters is located. No airports are in the immediate vicinity, however, and the pilot will have to leave his plane at one of the fields nearest the city—either at Knoxville, or others indicated on the accompanying table. The town is only 38 miles from Knoxville, and the park entrance is at the city limits. Gatlinburg has five hotels, two lodges and about 35 tourist camps, with rates ranging from about $4.

Flying into the region, best bet for pilots is to stop at either Knoxville, on the northern and Tennessee side of the park, or at Asheville, N. C., east of the park. From those two cities, with their several airports, flyers can either proceed with ground transportation or fly in to fields nearer the Park.

Both Knoxville and Asheville, near the heart of the Smokies, are famed as resort cities and have complete facilities for the FLYING vacationist. Since East Tennessee's lakes have only recently been opened to year-round fishing, the Knoxville Tourist Bureau warns that demands by anglers may exceed the dock facilities and hotel and housing accommodations now available. They suggest that flyers write in well in advance for reservations. The Bureau will forward requests for accommodations and facilities to the proper point, free of charge. Flyers should specify number of persons in

Standard of California's

PLANE FAX

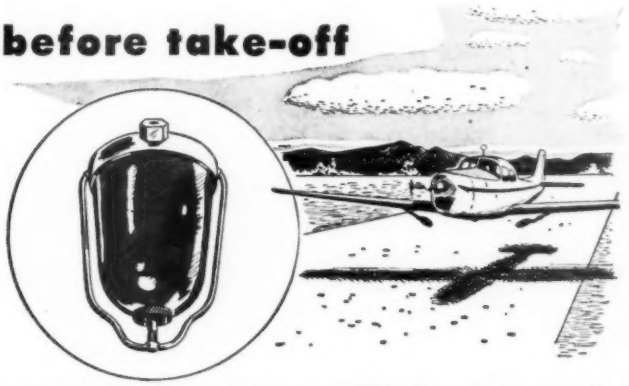
A page of service tips for private flyers and fixed-base operators

Central Utah Aviation Cuts Maintenance Costs

Edgar A. Poe and Myron W. Jense, of Central Utah Aviation, a flying school and transport service at Provo Municipal Airport, operate eleven planes. Overhaul periods ran from 150 to 200 hours. Mr. Jense writes: "Not being satisfied with this situation we changed to RPM Aviation Oil . . . overhaul periods now range from 560 to 600 hours. This, as you can see, has cut our maintenance overhead considerably."

Check your fuel system before take-off

It's a good policy to remove dirt and water from your fuel system during preflight inspection, because they can prove just as embarrassing as an empty tank. To avoid the possibility of trouble in the air, check your filter bowl and strainers and drain tank sumps before taking off. Another good policy is to use Chevron Aviation Gasoline because it's perfectly balanced for starting and cruising.



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"Play Safe . . . File a Flight Plan"

CHEVRON AVIATION GASOLINE

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the party, length of stay and other pertinent information. The Bureau points out that there are 33 recognized docks on the five lakes near Knoxville, with boats renting for 20 cents to 50 cents per hour, and from $5 to $12.50 per week. Outboard motors rent from 50 cents to $1.25 per hour and from $2.50 to $7.50 per day.

Airports at Knoxville include the Municipal Field (McGhee-Tyson) which is 13 miles from the city, and three miles from Maryville; and Island Airport, 2½ miles from Knoxville.

Richard H. Bowen, administrative assistant at McGhee-Tyson, promises "efficient, fast, courteous and clean" service to transient aircraft and suggests that his field is an excellent base for travel in the region. Limousine service into Knoxville is $1. There is no tie-down fee.

At Island Airport, the flyer can get a city bus to town for 10 cents. Tie-down charges are 50 cents, hangar charges $1 per night.

Asheville is the North Carolina gateway to the region, and has several nearby airports, among which are Josephson Airpark and Owen Field, both about two miles from the city, and Asheville-Hendersonville Airport, about 15 miles from Asheville. All are rated "Above Average" by AOPA.

FACTS ABOUT RESORT TOWNS

KNOXVILLE, TENN. Airport Transient Service is inaugurating service to the Great Smokies. Company also rents autos for 35 cents per hour plus nine cents per mile for first 100 miles and eight cents per mile thereafter. . . . Smoky Mountain tours are conducted by local hotels. . . . Four TVA dams within 40 miles of city . . . population 210,000 . . . for information, write Knoxville Tourist Bureau. . . .

GATLINBURG, TENN. Two miles from Great Smoky Mountain National Park headquarters (Blair Ross, superintendent) . . . bass and crappie waters at Douglas Lake, about 20 miles north . . . daily sightseeing trips to park: $3 to $12 per person . . . for information, write Gatlinburg Tourist Bureau. . . .

FONTANA VILLAGE, N. C. Fontana Dam is highest in eastern America . . . village is 1,800 feet above sea level . . . on southern border of park . . . for information, write Government Service, Inc., Fontana Dam, N. C. . . .

BRYSON CITY, N. C. Located on eastern end of Fontana Lake . . . county seat of Swain County, in which are the Great Smoky National Park, Nantahala National Forest and Cherokee Indian Reservation . . . for information write Swain County Chamber of Commerce, Bryson City, N. C. . . .

FRANKLIN, N. C. Headquarters of the Nantahala National Forest, with picnicking, camping and fishing areas nearby . . . Lake Emory is one of few spots in southeast where the game muskellunge is found . . . Franklin Airport "obligates itself to see that visitors are provided with boats, guides, motor transportation to points of interest, or for fishing and hunting if notified in advance" . . . airport also conducts weekly Sunday breakfast flights . . . for information, write Franklin Chamber of Commerce. . . .

SYLVA, N. C. Adjoins Pisgah and Nantahala National Forests . . . picnic grounds available . . . Chamber of Commerce will direct tourists to good trout fishing waters in county . . . Sylva Airport manager will make reservations for guests . . . for information, write Jackson County Chamber of Commerce. . . .

ASHEVILLE, N. C. An eastern gateway to Smoky Mountain region . . . nearby summer camps and guest ranches . . . site of late George S. Vanderbilt's multi-million dollar Biltmore House and gardens, open to public . . . five golf courses . . . birthplace of novelist Thomas Wolfe . . . for information, write Asheville Chamber of Commerce. . . .

Sectionals required for flying in the immediate vicinity of the National Park are Chattanooga (R-7) and Charlotte (R-8), although two other sectionals, Nashville (S-7) and Winston-Salem (S-8) should also be used by the flyer who covers the northern region.

A note of warning: don't overestimate your ability and don't take weather or terrain for granted when you fly through these mountains. As a general rule, when you approach the region it's best to follow valleys, main highways and railroads crossing the ranges.

CAA's manual, "Terrain Flying," (25 cents, U. S. Government Printing Office, Washington 25, D. C.) suggests:

(1) Seek advice from local operators before taking off on a mountainous cross-country.

(2) File a flight plan.

(3) Bear in mind the rapidity with which dusk closes in at day's end in the mountains. Allow an extra half hour if your destination is in the mountains.

(4) Don't fly below 1,000 feet, and fly higher if there is a strong wind blowing.

(5) When in doubt, go the long way around, but watch your gas.

The manual gives specific advice on flying in the Smoky Mountains. ". . . Cloud formations are encountered when the skies are clear a short distance from the mountains. At the edge of the mountains, the clouds are small and scattered cumulus, and they increase in size and height as one gets farther into the mountain area. Therefore, although the weather is perfect on each side of the mountains, bad visibility can and often does prevail over them.

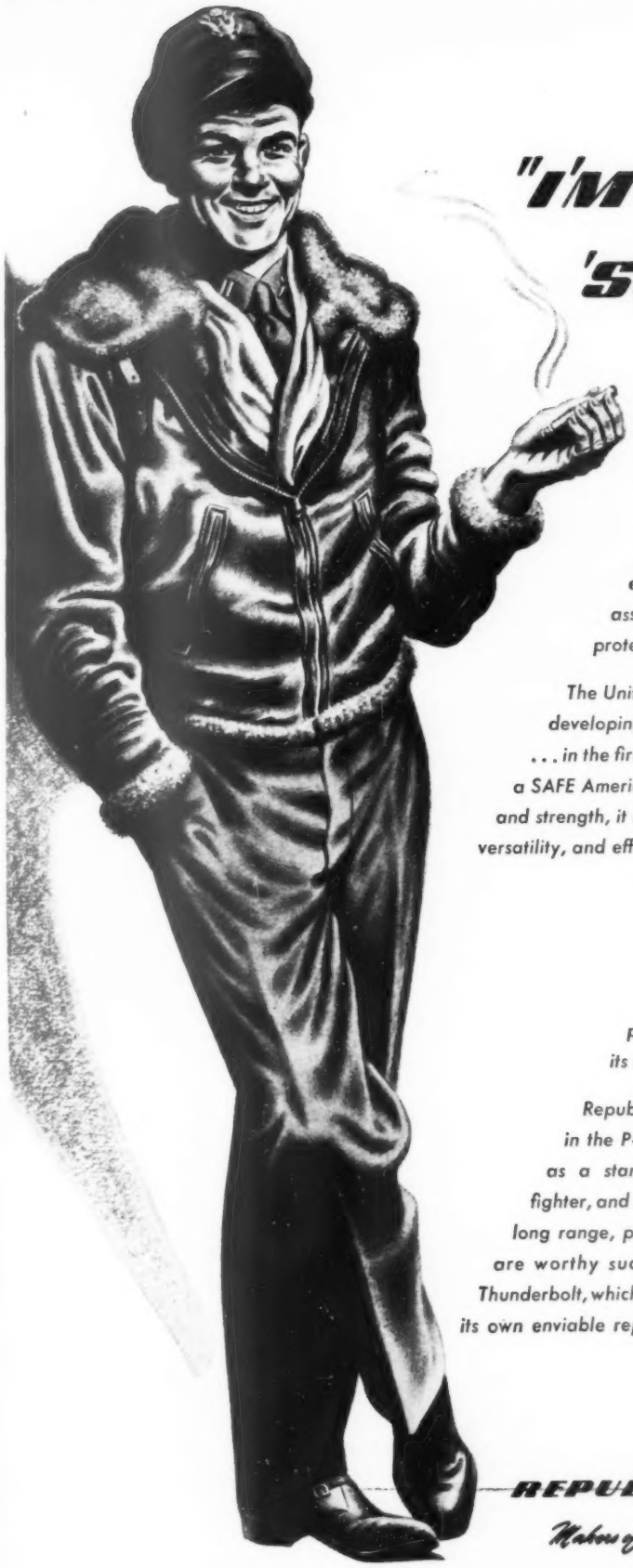
"Safest plan for the novice, or pilot inexperienced in mountain flying, is to land at an airport near the Smokies and get some advice from the natives. Mountain wind conditions are sometimes peculiar. At Morristown, Tenn., just north of the Great Smoky range, prevailing winds are northwest to southwest 60 per cent of the time. Just south of the range, some 60 air miles away, the winds at Asheville, N. C., blow north to northwest 26.4 per cent of the time and are calm 44.8 per cent of the time. This variation in wind behavior suggests special caution. . . ."

All this advice adds up to one basic admonition: take ordinary precautions, and *use your head*. That's good advice for any pilot; and following it, the FLYING vacationist should score 100 per cent on an aerial jaunt to the "Land of the Sky."

CHARLES L. BLACK

SOME AIRPORTS SERVING THE GREAT SMOKIES

Airport Longitude & Latitude	Nearest Town and Distance	Longest Runway	Gas Grades Available	Service Facilities	For Additional Information, Write:
McGhee-Tyson (Knoxville Municipal) (35°48′-83°59′)	Maryville, Tenn. 3 miles (Knoxville, 13 miles.)	5,000 feet	80-91-100 Oct.		Richard H. Bowen, Airport Administrative Assistant, Knoxville Municipal Airport, Box 990, Knoxville, Tenn.
Island Airport (35°57′-83°52′)	Knoxville, Tenn. 2½ miles	4,200 feet	80-91 Oct.		Manager, Island Airport, Box 909, Knoxville, Tenn.
Loudon Airport (35°43′-84°22′)	Loudon, Tenn. 2 miles	1,400 feet	80 Oct.		
Grey Airport (35°28′-84°36′)	Athens, Tenn. 2½ miles	2,350 feet	80 Oct.	Gas, oil.	
Andrews-Murphy Airpark (35°13′-83°52′)	Andrews, N. C. 1½ miles	4,900 feet	80-91 Oct.	Minor, free transportation to town.	Edgar A. Wood, Jr., Manager, Andrews - Murphy Airpark, Andrews, N. C.
Franklin Airport (35°11′-83°23′)	Franklin, N. C. ½ mile	2,800 feet	80-91 Oct.	Repairs, A&E, free transportation to town.	Macon Flying Service, Franklin, N. C.
Harris Airport (36°07′-83°17′)	White Pine, Tenn. ½ mile	1,900 feet	80 Oct.	General servicing.	
Lakeside Airport (36°04′-83°19′)	Dandridge, Tenn. 5 miles	2,300 feet	80-91 Oct.	Seaplane facilities also available; minor and major repairs.	Alfred A. Swann III, Dandridge, Tenn.
Sylva Airport (35°23′-83°11′)	Sylva, N. C. 2 miles	2,700 feet	80 Oct.	Gas, oil.	Sylva Flying Service, Box 22, Sylva, N. C. (Facilities Available June through September)
Josephson Airpark (35°36′-82°34′)	Asheville, N. C. 2¾ miles	1,800 feet	80-91 Oct.		Joe Josephson, Josephson Airpark, Asheville, N. C.
Owens Field (35°35′-82°33′)	Asheville, N. C. 1½ miles	3,100 feet	80-91 Oct.	Repairs.	W. P. Quinton, Manager, Owens Field, Asheville, N. C.
Asheville-Hendersonville (35°27′-82°28′)	Asheville, N. C. 10 miles	4,100 feet	80-91 Oct.		Manager, Asheville-Hendersonville Airport, Asheville, N. C.
Hendersonville Airport (35°18′-82°26′)	Hendersonville, N. C. 1 mile	3,200 feet	80-91 Oct.	Repairs, A&E.	Meyer Flying Service, Inc., Box 648, Hendersonville, N. C.



"I'M A 'SCIENTIST' NOW"

Remember the hot rock pilot of just a year or so ago? . . Well, luckily for all of us, this lad's still around. Today he's likely to be designated as project engineer and be flying research, or experimental planes . . . But whatever the assignment, he's still there . . . doing a job to protect our way of living.

The United States Air Force is alert . . . as ever developing new equipment, training personnel . . . in the firm belief that a STRONG America is a SAFE America . . . Despite a reduction in size and strength, it is making every effort to retain versatility, and effectiveness.

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I Learned About . . .

(Continued from page 40)

you'd find yourself listening to nothing. This can be disconcerting when you are depending on a beam to tell you where you are.

During the morning and early afternoon, the weather stayed the same. I talked to Maintenance about the hydraulic system, which had been slow about shoving down gear and flaps. Since the airplane was bound for surplus storage, Maintenance was not anxious to do any major repairs but promised to look the plane over, tighten the fittings, and fill the hydraulic reservoir. Then I drifted over to the Red Cross canteen where some nice motherly ladies were passing out coffee and doughnuts to a great slough of stranded air travelers, grounded just as I was.

While I was sipping my coffee and trying to engage one of the less motherly ladies in friendly conversation, a lieutenant sat down next to me, and said, "Say, boy, you going north by any chance?"

"Well," I said, "maybe. It depends on the weather."

This guy's name was Johnny and he was arriving home from a rough hitch overseas. He had ferried a war-weary Fortress in from Cairo and had hit the States only two days before. He had a leave and hadn't been home to Chicago for three years, so he was eager to be on the way.

"If you go north, can I hitch a ride in the back seat?" he asked. "South Bend is only 90 miles from home, and I can catch the trolley from there."

"Sure," I said. "Glad to have the company." So we spent the next few hours hanging over the weather sequence reports.

About three o'clock that afternoon, it started to clear a little at South Bend. Finally, by four o'clock, the ceiling was up to 1,500 feet, the visibility above three miles all the way, and the forecaster, who was sincerely tired of me, said that there was a better than 50-50 chance it would hold for a couple of hours. We grabbed our bags and while I filled out the Army Clearance, Johnny stowed the stuff in the ship.

Right then I made my first mistake. I was a senior pilot—all the more reason I should have known better—and so had the authority to sign my own clearance. This meant that the Operations Officer couldn't tell me to stay on the ground if I wanted to go—I could be a fool on my own authority and nobody could say me nay. The weather showed overcast at 2,000 feet, with scattered clouds down to 800 feet but no instrument conditions below 2,000 feet along the route. However, since the situation was marginal and likely to close down any minute, the forecaster could not guarantee contact weather for the 50 minutes it would take me to get to South Bend. I had to file a Conditional Instrument Clearance (CTC/altitude, they called it) which meant you'd fly contact until you couldn't any longer, and then you'd go on the gauges and continue the flight at a specified altitude. I said I'd fly direct to South Bend—not along the airway—and that my altitude, in case I had to go on instruments, would be 1,000 feet. For an alternate, I picked Chicago.

Of course I had no intention of flying instruments. I didn't have any instruments. But the weather guy had privately admitted he thought the weather would let me stay above 500 feet and still be out of the clouds, so I steamed out of Operations.

I should have had more sense. Even then, I knew I shouldn't mess around with doubtful weather when I had no instruments. Above all, I had no business filling out an instrument clearance when I couldn't fulfill the requirements.

Johnny was all strapped in, with his B-4 bag—a fat one— up under the turnover post between the cockpits. It was the only place to put the thing, but it meant we couldn't see each other. Then we discovered there were no earphones in his cockpit. By the time we'd found some, another 15 minutes had slipped away.

Then, the starter wouldn't work, so a poor lineman had to crank the engine by hand. Another 10 minutes. Finally, when the engine was running, we found the interphone didn't work. "Well," we said, "the hell with it, it won't be for long," and taxied out for take-off.

Tower gave us the clearance and we got away at 5:10. As I poured the coal to the engine I made some quick mental calculations—we were so late getting off it would be almost dark by the time we reached South Bend. Just as we passed the end of the runway, the tower called, "Army 894, your right wheel has not retracted." I took a look, and sure enough it was hanging down there all by itself. I got to work with the hand pump and gradually got it tucked up where it ought to be.

Then the tower asked, "You want to come back and get your hydraulic system repaired?" "No, thanks," I replied. "I'll let them fix it in South Bend," and headed out on course. That was my second mistake. A little delay, and I'd be getting to South Bend after dark, which would mean no visual check of the landing gear, which was another unnecessary chance to take. But I went ahead just like Gizmo, fat, dumb and happy.

The first 15 minutes passed uneventfully, but about 40 miles north of Dayton we ran up against a solid wall of cloud. I tried to duck under it, remembering that the clouds were supposed to be "scattered." By the time I had pushed under that cloud layer for a couple of miles, I was down on the tree-tops and it had started to rain. For once, I quit the foolishness and turned back south.

A minute or so later we broke out, so I pulled back up to 1,000 feet and coasted down the cloud wall toward the east. The front is to the west, I reasoned, so it ought to get better somewhere east of here. It didn't. I went about 50 miles before I gave up and turned west. Shortly after I crossed the course line I did come to a break—not below, but above. There, stretching out northward, was a beckoning vista of pretty white cloud. There was a thin overcast much higher up, at about 5,000 feet, and a solid overcast below, up to about 1,500 feet. In between was a great clear space of air,

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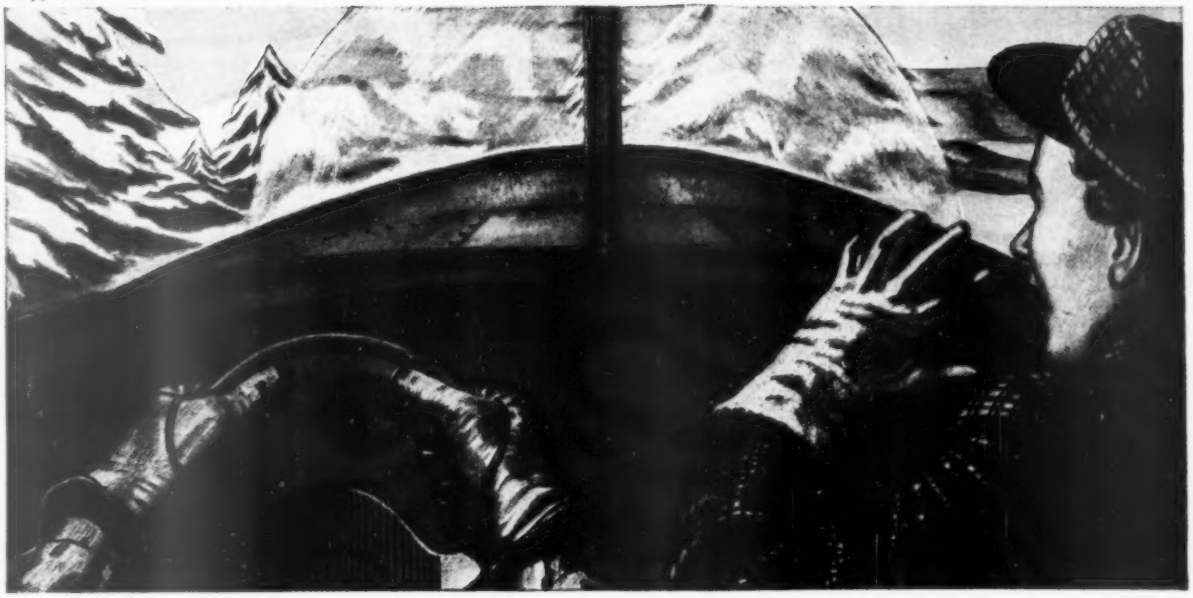

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"The terrain was extremely hard to determine when blanketed with solid clean snow, but I knew I should have been on the ground and kept feeling and feeling for it. It wasn't there! Suddenly that hill loomed up just in front of me. By then my air speed was below fifty, and brother, was I panicky! I knew I couldn't make it, and thought of that beautiful plane stalled out in the treetops. But I gave it full throttle, eased the nose up, and prayed. Just as I skimmed over, I breathed a sigh of relief. I had had faith in an Aeromatic before, but that little episode really sold me. I'd sooner lose my main gear than my Aeromatic."

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and away to the northwest I could see sunlight! This is for me, I thought, and turned due north. Mistake number three, and a big one.

The radio was having a lucid interval, so I tuned in Fort Wayne range in time to pick up the weather broadcast. The ceiling in South Bend was down to broken clouds at 1,200 feet, overcast at 5,000, light rain. Little worse, not much. I'll be there in 30 minutes, I figured, so why worry? I did worry about what Johnny must be thinking in the back seat—no radio, no map, knowing I had no instruments. Anyway, I headed up that inviting airspace between the clouds, already picturing the nice hole in the lower cloud deck I would find waiting for me right over the South Bend airport.

Ten minutes later, the sun in the west was gone and there was a gray wall of clouds instead. The lower deck had risen and the top deck had come down. I was at 3,500 feet, anything but contact, with the clouds about 500 feet above and below me. I cranked the radio dial around to the Goshen frequency just in time to hear Goshen Radio call, "Army 894, Army 894, this is Goshen Radio, I have a message for you, Over." I tried to call him back, but after five minutes of futile shouting at the microphone, during which the clouds had ominously closed in a little tighter, I gave up and called Fort Wayne instead. After a while I raised them, and asked, "What is the message Goshen Radio has for Army 894?"

In a few seconds they had the information. "Chicago control advises," the deadpan voice pleasantly recited, "that South Bend is now closed account weather. Ceiling 200 feet, visibility one-eighth mile. Will you proceed to your alternate?"

My heart changed suddenly to a soggy, leaden mass, and plunked painfully against the bottom of my stomach. Chicago, the alternate airport I was never going to use, because I wasn't going to fly any instruments anyway, was now behind the same wall of instrument weather that was shutting down South Bend. I looked behind. The hole I had come through was gone. In every direction were clouds through which I was going to have to fly and I wasn't equipped to do it. At last I began to do a little thinking. What I want, I explained to myself, is to get on the ground, quick, before there is no place left to go.

I called back to Fort Wayne. "This is Army 894. What is the weather at Fort Wayne?"

They came back, "Fort Wayne is instrument, ceiling 700 feet, visibility one-half mile." I began to feel a little desperate. I asked about Indianapolis. Closed. Then Dayton. Fort Wayne said, "Dayton has 1,500 foot ceiling, broken clouds, visibility five miles." No love song ever sounded sweeter.

"Well," I said, "This is 894. I'll go back to Dayton. Will you request an altitude from Chicago control?" They said, "Roger. What is your present position?"

They had me. I didn't know, except that I was in the southwest quadrant of the Fort Wayne range. I had to admit I didn't know, but I tried to camouflage the fact as skillfully as possible. "I am," I declared with a confidence I did not feel, "about 15 minutes southwest your station." I knew I couldn't be much over 15 minutes away, because the radio wasn't good enough to receive much farther.

"Army 894, hold your present position until we get clearance for you." Okay, I held my position. It's hard to do when you don't know for sure what position you are holding, which way you are heading, and you are moving about 200 m.p.h., but who'll ever be able to prove I didn't hold it?

Pretty soon they called and said to fly the airway to Dayton at 5,000 feet, turn east off the airway at Dayton, and let down out of the clouds, off the airway. I gave them a "Roger" and started east to intersect the southeast leg of the Fort Wayne range. I hated to go up to 5,000 feet, but I figured it would be better to get on the altitude than to bump some innocent airliner—I had that much sense. At 5,000 feet the clouds were fortunately broken enough so that I came out in the clear for a few seconds every three or four minutes. During the minutes in the clouds, I worked up a steady, dripping sweat: I had the ball of the bank-and-turn indicator (the needle was no good), a sticking compass, an airspeed indicator, and the altimeter. I tried to comfort myself by thinking back to the old days, when the lads flew the mail in DH-4's with a saucer of coffee in their laps. When the coffee didn't spill, the airplane was right side up, or at least in a coordinated turn. I can do it, if they could, I cried, clapping myself feebly on my back. Then, just when I was beginning to hit the edge of the beam, the radio quit!

I turned to what I thought might be the southeast heading of the range leg, knowing I was close to the beam, and alternated between banging the compass to unstick it, and banging on the radio in hopes some miracle would restore it to good health.

By now, it was dark. Thoughts kept running through my head, like: I am a damn fool; poor Johnny, what's he thinking back there? I am a damn fool; why doesn't the radio work? I am a damn fool; why did I ever get myself in this mess? I am a damn fool. Before long, I was convinced I was a damn fool, and would gladly have admitted it to the Commanding General himself if he would only come up and get me down from there.

I *was* maintaining altitude. The altimeter worked fine, and I kept my 5,000 feet on the button. But I would smack the compass, it would dance around, and come to rest 20° off course. I would smack it again, and it would stop 20° off course the other way. Maybe, I thought hopefully, I am right on course. Just then the radio started to work again, so I picked up the Dayton range, and found I was off to the right a few miles, but fairly close to the beam.

What with spurts of radio, interspersed with unwelcome radio silence, I managed to wander over the Dayton cone, and headed more or less east to get off the airway. I called Patterson tower, and was reassured about the weather there. When I guessed I was pretty well off the airway, I was just going to call for permission to let down, when God really moved over on my side. A wonderful, lovely, blessed hole showed up right underneath me, through which I could vaguely make out the lights of a town.

I'd flown around that part of the country a good bit before the war. I recognized the town as Springfield, O., just where I wanted most to be. After a mumbled prayer of thanksgiving, I gave the tower a quick call and told them I had a hole and was coming through. They cleared me for a contact descent, and I really whistled down into that hole in a very big hurry; after all, I was flying a dive-bomber.

When I spotted Patterson ahead, I heaved a big sigh and I could almost hear the sigh Johnny pushed out. Then I remembered about the landing gear. Would it come down? It was dark, and would I be able to tell whether it was down or not? I had a few minutes of mental struggle over that one, but I was really so glad to be able to see the ground again I didn't much care. We whipped around the field, let the gear down—there was a good thump, and I could feel the locks snap into place—and sailed

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on to the approach. I pushed the flap handle, and nothing happened. I pumped the emergency pump, and still nothing happened. But I didn't need flaps.

Then I turned on the landing lights. Rather, I turned on the switch. No lights. But despite the distractions, the landing happened to be a smooth one—almost a grease job.

As we touched the ground, the radio quit again. I just laughed.

When I cut the switch, after parking the ship, the clock said 7:20. One hour and twenty minutes extra flying time, over the 50 minutes the clearance had indicated we would be aloft. A truly well-planned, well-executed, pilot-like flight.

I loosened my safety belt and looked around at Johnny. "A nice landing," he said encouragingly. "A very nice landing."

"It was all right," I replied modestly, and waited for the cursing to start. I kind of expected Johnny to tell me how he had flown 87 combat missions, but had to come back to the States to get almost killed. But he didn't. He was a nice guy.

In fact, he rode to South Bend with me next morning, but by then the weather was really clear, they'd fixed the hydraulic system and the radio, and I wasn't taking any more chances. I'd learned about flying from that. END

Desert Flying Is Tough

(Continued from page 27)

by Carl Crawford, now in Sweetwater, Tex., who has been flying as an instructor, aerial photographer, and cross-country charter pilot since 1926. He has put in thousands of hours over all parts of the mountains and desert wastes of the west.

"Let's consider the airplane first," Crawford says. "It should be rugged and in good condition. If the engine has any tendency to overheat, the cause should be found and corrected. On take-off and climb and in flying at low altitudes in extremely hot weather, heating can cause accidents. I say the plane should be in top shape because desert air currents kick it around. Sometimes whirlwinds will put a plane on its back.

"The plane should be equipped with a canteen or jug of water in case of a forced landing. Recently a couple of fellows were forced down near the Grand Canyon and walked 40 miles before they found a drop to drink. They were in bad shape. Pilots should carry charts and either a pocket compass or a screwdriver to remove the compass from the airplane. That seems like a small thing, that screwdriver, but in the case cited above a compass would have shortened the time of rescue."

Crawford also suggests emergency rations.

"There are places in the western part of the United States where you can walk for miles without seeing a human being or a house," he declares. "It's also a good idea to carry a kit of emergency equipment, such as spark plugs, nuts and wire and screws."

Crawford is a zealot for filing flight plans and also recommends that the destination be called and given the pilot's estimated time of arrival.

Luckily the men who crashed on the mountain did this. When they didn't arrive, an alarm went out. I think that a pilot, setting out over wasteland and difficult terrain should take this precaution for the sake of others as well as for himself. If he does go down, a single course can be searched instead of it being necessary to search in all directions from the point of departure.

Crawford is also a stickler for plotting a course. He believes in taking out "arrival insurance" in a very novel way.

"Suppose you are in San Diego," he says, "and you want to fly to Needles, Calif. Note on the map that the Colorado River flows north and south and is on your right. In figuring your compass course, make a slight correction to the right. The result will be that you'll bump into the Colorado River before you hit Needles and therefore will follow it right to destination. On the other hand, if you make an error to the left you will miss Needles and be out in open country, strictly desert wasteland, with few landmarks and no river to guide you."

As an example, Crawford cites the case of a friend who left San Bernardino to fly to Las Vegas and wound up near a mine in Immigrant Valley, 107 miles west of Caliente, Nev., after missing Las Vegas by about 75 miles. The man had picked up a cross-wind. He ran out of gas, set his plane down on a dry lake, slept under the wing of the plane overnight, hiked to a lead mine the next morning, and then made a 215-mile trip in a borrowed car to get 15 gallons of automobile gasoline.

"If the pilot had charted his course with a slight intentional error to the south of Las Vegas," Crawford says, "he would have smacked right into the Lake Mead territory and would then have found the city. He committed the crime of making an error to the north and found himself in a territory without suitable landmarks."

Crawford uses a compass and course check which is both novel and effective. First he plots his course. Then he finds a railroad track, highway, fence line or any other line which leads to where he is going, if only for a short distance.

"I fly these lines," he says. "Inasmuch as they head exactly in the direction I am going, even for a short distance. This gives me an accurate reading to check against the calculations I have made on the ground. In a low-powered plane I always lay my course so as to hit an airport to gas up in case I strike a headwind. A precautionary landing is easier than a 40-mile walk. And I always pick the lowest possible terrain when in a lightplane."

Crawford warns against needlessly flying over a country which is alternately row after row of mountain ranges and long shallow valleys. Ranges such as these, running parallel, are from a few to 50 or more miles apart.

"The wind may be blowing in one direction in one valley and another in the next," he says, "or the wind may be blowing harder in one valley than the next. Again, wind is usually blowing harder in the valleys than along the ridges."

He urges pilots to watch every ground sign, such as whirlwinds, smoke, clouds of dust sent up by ground vehicles and other

indications.

"One way to determine drift," he says, "is to get just above cumulus clouds. Better above than below because the air is not so bumpy. Study the ground, pick the shadow of a cloud, watch its direction and speed. This allows you to compensate approximately for drift."

At take-off, Crawford advises:

"Leave early in the morning. The air is smooth and 'solid' then. Climb is easier, more comfortable. You're high where the air is smooth. Stay there. At 10,000, the air is cooler. Up and down drafts set in on the desert at from 7 to 10 a.m. The higher you are the less they'll bother you. Not only that but western landmarks are massive and the higher you go the easier it is to make them out. For instance, San Francisco Peak, the great Arizona landmark, is visible for at least 150 miles from 10,000 feet, particularly when it has clouds around it, which is a common phenomenon known to desert fliers who are always watching for it. Guadalupe Pass, in West Texas, is a great landmark to and from El Paso. There are many more mountains which can give you a straight course to where you're going."

Crawford stresses against overloading in desert flying.

"This is particularly true when leaving a low level field, or a field situated near the ocean where a take-off at peak load is not difficult early in the morning. With this same load on the desert at noon it is quite possible you won't get off the ground at all. Cut your load in every way possible except gasoline. It's the most precious commodity in your airplane. Next comes oil and be sure you have plenty of it. After that, water."

Crawford pointed out that only recently, in a desert city in Nevada, a pilot with hundreds of hours of experience took off with an overloaded two-place 65-horsepower lightplane. He was carrying three people.

"He got clever and buzzed an automobile," Crawford relates. "He then pulled up. He didn't realize how his overload and the thin, dry, hot desert air affected his stalling speed. He stalled, went in on his nose from a low altitude as his spin started and all were killed instantly. So great are the vagaries of desert air that at Barstow, Calif., there was a standing rule that only one person was to be allowed to fly in a 40-h.p. aircraft between 10 a.m. and about half an hour before sunset."

Crawford has one wind fact implanted in his mind that every desert pilot should know. This was recently illustrated by a fairly inexperienced pilot from Los Angeles who went out into the desert and started "playing around" in a box canyon in a low-powered airplane.

"This fellow had walls on both sides of him and a wall ahead of him," Crawford relates. "Because he had a headwind he figured he had more time to climb to get over the top and kept on going—that is until the ground started coming up to him. Belatedly he realized that something was wrong with his theory and tried to turn. He dug a wing into the ground and damaged his airplane seriously.

"Analyze this situation and you find that a tail wind is what he needed. Coming

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along with him and rising, and being forced to go over the wall ahead of him, it would have lifted him up. The headwind was coming *down* over the wall ahead of him, like a waterfall. And, by the way, any time you find yourself in a downdraft of this or any other kind, don't try to climb into it. Stick your nose down and keep up flying speed. No airplane can climb as fast as some of the desert downdrafts unless it is a high-powered or jet military aircraft. Downdrafts can reach a speed of 3,000 feet per minute."

Crawford has some other helpful pointers.

"You can climb faster on the sunny side of a mountain than on the shady side if the air is calm," he says. "This is because of the rising air, heated by the sun. Too, suppose you are going east along the north side of a mountain with the wind blowing south. If you get reasonably close to it the rising air will get you altitude."

Crawford says that there have been scores of accidents resulting from pilots trying to cross ridges against a headwind—a situation similar to that encountered by the pilot who tried to fly up the box canyon.

"The air has been pushed up the other side of the mountain, has been cooled by altitude, and now rushes downward toward you like a cascade," Crawford says. "It's just like water going down a steep embankment. Your safest bet is to go around the mountain. It's longer but you'll live longer, too."

Crawford also warns against changing conditions during the day on desert landing fields and airports, particularly when runways are paved or are bituminous-surfaced.

"On a flight just after sunrise, the inexperienced pilot will pick a spot and probably land right on it," he says. "At noon, when the runway is heated, he can make exactly the same approach, using the same altitude and speed and judgment points, and he will float half way across the field, held up by the hot rising air from the runway. This is good to know when you are faced with noonday landing in a tight spot."

And now a last, but very important question. Should a pilot who has been forced down leave his airplane?

"If the pilot knows that there are habitations near, has a chart and compass and is uninjured, yes," Crawford says. "If he is hopelessly lost and sees no sign of habitation and *IF* he has reported destination, course and estimated time of arrival, it is better to stay with the plane, for search is sure, and an airplane is easier to spot than a man."

All in all, the problem of desert flying is so tough, and search and rescue are so difficult, that local groups are organizing aero search outfits. One of these is in southern Nevada, where Deputy Sheriff John V. Lytle, a pilot, has organized the Sheriff Glen Jones Aero Squadron. It is not uncommon for planes to be missing for months in these isolated areas before they are located by chance. Some have never been found.

Somewhat similar is a volunteer air posse organized at Tucson, Ariz., to help hunt persons lost in the desert. Sometimes bloodhounds from the Florence Penitentiary assist in the ground search. But the downed plane must be located first—and that means: file a flight plan! END

Airport Test Case

(Continued from page 31)

are concerned. They have retained Buckingham, Doolittle and Burroughs; Slabaugh, Guinther, Jeter and Pflueger, and Wise, Roetzel, Mason, Kelly and Andress.

These 18 names give only an idea of the importance of the case and the cost of fighting it. Chamberlain's costs are at least $55,000 already and are bound to increase. This breaks down somewhat as follows: legal fees and expenses of witnesses, more than $20,000; special surveys and studies, $5,000-$6,000; rent for 2½ years during which airport has been idle at $7,000 per year, $17,500; damage to preliminary grading and earth-moving by erosion because of delay, $10,000-$15,000.

But these expenses may be only a beginning. No work is now being done on the airport and rent is continuing. Work will not be started until the Ohio State Supreme Court hears the case, and it may be next fall before the court even makes up its mind whether it will hear it. Even that may not be all, for after that the case can still be fought through the Federal District Court, Federal Circuit Court of Appeals, and even the United States Supreme Court.

Meanwhile the airport is lying unused at $7,000 per year rent, and the unstabilized and uncompleted raw grades on which nearly $50,000 has been spent are eroding and slumping. Chamberlain purchased a metal hangar which had already been delivered to the site when the injunction was granted. He feels fortunate to have sold this in the original crates.

"It's important that airport operators know these things before going ahead," he warns. "Until airport law becomes pretty well settled, operators attempting to fight suits like this one may find themselves with enormous legal expenses from which they will have trouble recovering."

Such was the case of a young Ohio veteran who started a small airport three or four miles from Chamberlain's proposed operation. Farmer residents nearby, one of them a lawyer, sought an injunction in the same court that granted one against Chamberlain. Although Chamberlain helped the vet in his County Court suit, Judge Colopy again granted an injunction. This case is pending in the Court of Appeals. Meanwhile, of course, the airport is not operating—and neither is the veteran.

The only planes that have used Chamberlain airport so far are three or four craft that made emergency landings on it—including a P-80 headed for Cleveland Municipal Airport that was refused permission to land there because of bad weather. The uncompleted airstrips are the only things that saved these airplanes.

Chamberlain feels that some of the tactics used against him have not been exactly cricket. There was the time, for instance, when his opponents sent three airplanes to beat up the joint at 6 o'clock one morning. Residents of Fairlawn were startled to hear what sounded like the start of a big wartime raid, with engines revving up and planes in low dives. It turned out to be a Lockheed *Lodestar*, a twin-engined Beechcraft, and a BT-13, flying at low pitch and

END

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low altitude. Theoretically this exhibition was to demonstrate the type of noise that Chamberlain's airport would make a permanent feature of the neighborhood. Two intervening petitions in the suit before Judge Colopy were based in part on the flight of these buzzing planes which had disturbed the tranquility of Airlawn.

It is a matter of record that some of the airport case plaintiffs complained to CAA about the low flying before they discovered that it was their own side that had planned it. One plaintiff, ill at the time and breakfasting in bed, was reported to have tossed his tray clear to the ceiling when he thought a plane was coming through his roof. It is also a matter of record that CAA never brought any action against the buzzing pilots. One of the pilots admitted (off the record) that maybe the CAR had been stretched a little, but said he hadn't had so much fun in years.

What were the findings and decisions in this legal battle which has been dragging on for over a year? They contrast markedly with the first decision by Judge Colopy which granted the injunction against the airport.

Judge Colopy ruled that "the evidence clearly shows that the Chamberlain Engineering Company will inevitably commit nuisances, trespasses and irreparable injuries against the plaintiffs as alleged. . . ." He held, for example, that the noise made by the airplanes using the airport would cause the complaining home owners "actual, material and substantial impairment of the enjoyment and use of their respective homes." In the case of two of them, he found that the airport would cause "reasonable fear and apprehension of physical injury to members of their respective families from low-flying airplanes over their properties."

Despite the testimony of S. B. Randall, chief engineer of the Ohio Department of Aviation, who had asserted that the site was one of the best locations for a Class I airport in Ohio, Judge Colopy said: "There is no distinct public interest in maintaining this airport at its present site. . . . There is no lack of more suitable and available land for airport purposes in this general vicinity more distant from Akron."

Judge Colopy continued: "Appraising the public interest as such in promoting aviation, it is my judgment . . . that the interest is best served by having airports located with reasonable regard for the rights of other people and also at such places that the inevitable expansion of that industry may be observed. The location of private commercial airports at such places that it becomes necessary for the planes to fly a traffic pattern over a populous city is not for the general good, in my judgment."

This reasoning probably can be defined as the "conventional" view. It is a viewpoint akin to the early restrictive laws against automobiles. The Court of Appeals takes a more "modern" view, recognizing that the common law of aviation and airports is still in the formative stages and that the court has a responsibility in forming that law.

"We must not only weigh the conflict of interests between the airport owner and the nearby landowners," says the court, "but we must further recognize the public policy of the generation in which we live. We must recognize that the establishment of an airport of the kind contemplated is of great concern to the public, and if such an airport is abated, or its establishment prevented, the consequences will be not only a serious injury to the owner of the port property but may be a serious loss of a valuable asset to the entire community."

Before property use can be considered a nuisance and subject to injunction, the court believes, the injuries it causes must be "appreciable, substantial, tangible, resulting in actual, material, physical discomfort and not merely a tendency to injure." To state that the airport would cause such injury to the homeowners would be only "guess and speculation. And to find that the use as an airport of approximately 450 acres of land beyond the city limits and away from the closely-built-up and congested part of the city is an unreasonable use of the land, would, we think, under the circumstances of this case, obstruct the development of aviation, as a legitimate and necessary industry, to an unreasonable extent."

Undoubtedly the homeowners will experience some discomfort, the court admits. "But that is one of the incidents or results of residing in a heavily-populated, highly industrialized state. It is an incident of living in an age of progress, in which there are erected huge rubber factories, [an Akron Beacon-News account omitted the word 'rubber'] with their accompanying smells and noises; in which the streets and highways are used by great, noisy trucks for transportation . . .and in which thousands of various industries throughout the cities and countryside contaminate and defile the former natural beauty, peacefulness and quiet of the vicinage."

The court took the view that an injunction to stop an airport should not be granted unless the injury it would cause was so great as to be incapable of compensation in damages. If the sale value of a home owner's property is lessened by the airport, and he can prove such damages, he can be compensated in money and it is not necessary to grant the extraordinary remedy of an injunction to close it.

The court realized the importance of its decision. "Whatever we decide here has a bearing upon every airport in this state," the judges pointed out. "On the part of the plaintiffs it is in most part a question of comfort. On the part of the defendant it is a question of the life or death of a legitimate and necessary business." Accordingly, the three judges, P. J. Doyle, J. Stephens and J. Hunsicker, were unanimous in their agreement to dismiss the petitions of the home owners.

The court also made another significant finding. For the first time, probably, in any court, they faced the question of defining Federal control of the airspace during landing and take-off. Both courts agreed that the Federal Government has control over the airspace and the CAA has police powers to administer that control. But Judge Colopy held that that control didn't begin below the 500-foot minimum flight altitude prescribed by the Civil Air Regulations. If this viewpoint were universally applied, any airplane would be trespassing over any property not owned by the airport during landing and take-off.

If the CAA recommendation of 20:1 approach and take-off ratio were applied, Chamberlain would have had to own or have easements over 16½ square miles of land to prevent his planes from trespassing on the airspace over another's property. At a minimum, every airport would have to be protected over a take-off area extending 10,000 feet beyond the end of its runways! Under such restrictions, virtually every airport in the country would be closed.

The Court of Appeals rejected this interpretation. It pointed out that CAA has defined the navigable airspace as 500 feet above non-congested areas and 1,000 feet above congested areas, *"except when necessary for take-off and landing."* Accordingly, the Court decided that the Government and not the home owner has control over low altitude airspace in the landing pattern.

Chamberlain was aided in his defense by the Ohio State Board of Aviation and by the Aircraft Owners & Pilots Association. The Civil Aeronautics Administration had promised help but withdrew at the last minute. He still has a long row to hoe before planes start landing and taking off from his airport. But when his fight is fought to a successful end, he will have made it easier for other airport operators everywhere in the country. END

Report from Washington

(Continued from page 36)

caused by snow. Also keep your tail lower than normal, be prepared to go on instruments if the windshield frosts, and watch out for carburetor ice. . . . It's tough flying up there any time, and it's toughest in winter. Good place to stay away from, in fact, say the experts.

Collective Beating

Any way you look at it, the private pilot, lightplane aviation and the small fixed base operator took a collective beating in the first two rounds of the current fight to determine national aviation policy. A few well-chosen, nice words were said for personal aircraft and flying by amateurs—but they were without substance.

It might also be noted that among the Board's advisers there were no lightplane representatives, nor were any invited to testify at the hearings that preceded the writing of the report. The sense of the report, as well as the concensus of those who wrote it, would seem to be that we are on a near-war basis, which may turn out all too soon to be bitterly true.

Wingless West Point

While the Congressmen are at it they might take more than a quick look at the way military flight talent is being prepared for an emergency. West Point takes all the students, once during their career, on a flight (much publicized) in a fleet of Fairchild *Packets*. Far from being underlined, aviation is de-emphasized. "Our goal," to quote one West Point officer with whom we talked, "is to turn out college graduates

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with a military background."

Thinking this a little on the conservative side, we looked up top brass at the Pentagon concerned with high policy in the newly-created Air Force. How about a West Point of the Air, we asked. Nope, nothing to it, we were told—at least at present. Secretary Symington's policy as this goes to press is to take Air Force officer recruits from West Point, Annapolis and the general public. If these sources do not develop the right kind of men, he says, an Air Academy will follow. If the Point or Annapolis begin unduly to expand their air training activities, an Air Academy will also follow. Otherwise, the status will remain *quo*.

If one makes the point that a great many of the top flight officers in World War II were retired from combat before they were as old as the average West Point graduate, and that as the planes get hotter, youth is more at a premium—well, it's just a point. No matter how you slice it, West Point is not training any pilots, nor is the Air Force making West Pointers pilots until they have become college graduates, aged approximately 22.

Public Relations

The Congressional Aviation Policy Board commented tartly on one thing, incidentally—military public relations. "Some of the bids for public acclaim by the Air Force and the Navy," said the report, "constitute an undesirable practice and mislead the American public on aircraft performance, in addition to disseminating information which could be of value to a foreign power and should be closely guarded.

"It gives a false sense of security to the public to learn that a military aircraft has flown the spectacular distance of 10,000 miles when it is not made clear that the distance was possible only because the aircraft was stripped down. . . It is equally misleading to make the flat statement that a military aircraft has flown faster than sound when it is not explained that such an aircraft is years short of utilization in combat."

It is even further puzzling, to us, to run across Air Force security when, far from telling all, it refuses to tell anything. The other day we heard that the AF had compiled a 75,000-word German-English aviation dictionary. We asked Wright Field about it, and whaddya think? "We are in receipt of your request for a copy of the 75,000-word German-English dictionary compiled by this command. This publication carries a restricted classification." Better be careful how you use your Webster's or it will get restricted, too.

Teeth in the Regs.

By the time you read this, the days of slipshod non-scheduled transport operations will be one with barnstorming and the flying circus. The Civil Aeronautics Board has revised Part 42 of the regulations, put teeth in it, and filed 'em needle-sharp. Some of the new regs are as tough as a blackjack, like the one requiring that there shall be no single-engine night passenger flights by non-skeds. Daylight contact flights only will be approved.

But the Board says that the rule is no tougher than accidents such as killed the governor of Oregon recently, nor any more severe than the rules laid down governing scheduled transport flying. Indeed, says the Board, objective is to level off all transport flying, scheduled and non-scheduled, at a new high safety level. Pilot competence among the non-skeds has been upped, co-pilots must have instrument ratings, planes must have full-feathering props, maintenance must be at scheduled transport level, all night flying is out except on lighted airways.

The Board believes the result, far from damaging non-sked operations, will make them more reliable, popular and profitable. They admit, however, that it is going to eliminate a lot of the little fellows and that most of the big ones are already observing the new Part 42 amendments and have been for some time.

Toward Air Parcel Post

Two things you may expect to see in the not distant future are air parcel post and a greatly expanded air mail service—the Congressional policy boys believe that all first class mail that can be expedited should be flown. "Appropriate legislation should be enacted for establishment of domestic air parcel post," says the policy board, "at reasonable experimental rates."

Hardly had they gotten the words out than Postmaster General Jesse M. Donaldson announced that air parcel post is a reality between the United States and 21 foreign countries. These include Bermuda, the British Isles, a number of the friendly continental countries, and such distant spots as the Belgian Congo, Turkey and the Union of South Africa. Not bad rates, either. After the first four ounces, you can send a big package to Egypt, for instance, for 64 cents per each additional four ounces. The first four come higher—$1.35. Highest rate of all is to the Belgian Congo—$1.38 for the first four ounces, 79 cents thereafter.

Revising No. 24

Few days ago Thoburn C. Lyon, formerly a chart engineer with Coast and Geodetic Survey, came into the office with two books under his arm. One was the familiar CAA Bulletin No. 24—"Practical Air Navigation." The other, bound in blue instead of brown, was the same thing—with a lot of difference. Knowing that the Government version is nearly four years old and at times sway-backed with gobbletygook, Mr. Lyon has rewritten and reillustrated it from cover to cover, adding a great many things that will delight pilots.

Included in the new book is a chapter on lightplane navigation. To give you an idea of the Lyon approach, here's the first paragraph: "Cross-country flying can become such serious business that there is no pleasure in it. It can also be made painless and pleasant." Mr. Lyon goes on from there. He also lists the chapters that lightplane pilots should read for background, those that should be studied, and those that can be skipped—cutting your reading quota in half without the danger that you may be skipping something vitally important.

For this commercial edition Lyon got the help of his old associates at C&G and CAA. Unlike the Government version, the Lyon job is up to date as of November, last year. The author expresses the hope that his book "will contribute much to the advancement of practical air navigation." END

Our Unusual Airports

(Continued from page 20)

Calipatria Airport at Calipatria) nestle down at 180 feet below sea level. Port Mecca Airport is about 12 miles northwest, and Calipatria Airport about nine miles southeast of Salton Sea, which is 245 feet *below* sea level.

At the other extreme is Teter Airport at Fairplay, Colo., which lies 9,700 feet above sea level. During the war, however, the AAF used to maintain a flight-strip at Leadville, Colo., which was 10,000 feet above sea level. This field has since been abandoned. If California can't always be first, at least it can place—it has a U. S. Forest Service field at Olancha which is 9,100 feet above sea level.

There are 10 fields having paved runways at least 10,000 feet long: Pinecastle A. A. F., Orlando, Fla.; Barksdale Field, Shreveport, La.; Kirtland Field; MacDill Field, Tampa, Fla.; Lewistown, Mont.; Smoky Hill A. F. B., Salina, Kan.; Clovis A. F. B., Clovis, N. M.; Moses Lake A. F. B., Wash.; Marathon, Fla.; Mountain Home A. F. B., Ida.

Howard Hughes goes for huge airports as well as huge seaplanes. His Culver City, Calif., airport has a strip which is 9,100 feet long.

Understandably, the state having the most airports is Texas (largest area, great distances, and good weather result in increased airplane utility). It had over 450 fields on March 1, 1947. And California was in second place with 420. Florida, with 213, was third. At the bottom of the ladder came little Rhode Island with only six airports listed.

Running the gamut from A to Z in airport size (let's exclude the military from the size category) and cost, we find: (a) that there is a private field up in Maine that is 600 feet long and 100 feet wide (about 1.4 acres), which cost $95 for acreage and $750 for a T-hangar; and (b) that Idlewild on the Jamaica Bay shore on Long Island totals 4,900 acres, will have seven 6,000-8,000-foot tangential and parallel runways and will have a total cost of well over $150,000,000.

Though the Muroc, Calif., airport has the largest acreage in the U. S., its two 8,000 and 5,240-foot paved runways aren't in the running when it comes to paved runways. The "champ" is Turner Air Force Base at Albany, Ga. It has the most paved runways (11) and the most lineal feet of pavement (60,100). Clovis, N. M., Air Force Base (with only four runways) has the most square feet of pavement—over 12,600,000. When the new $150,000,000 New York Idlewild Airport's seven runways are completed in late 1947 or early 1948, they will have some 10,000 fewer lineal feet of runway pavement than Turner and not quite as many square feet of paved runway as Clovis.

The largest airline terminal, with respect to number of runways and square feet of pavement, is Chicago Municipal Airport. It has nine runways. LaGuardia and Washington National have only four runways each.

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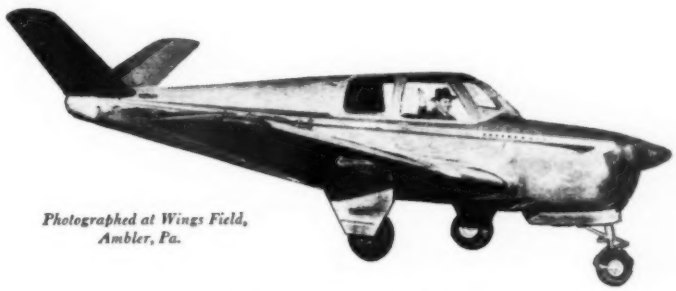

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Allegheny County Airport at Pittsburgh—despite the fact that its longest runway is shorter than either Washington's or LaGuardia's and despite the fact that its two other runways are both shorter than any of Washington's or LaGuardia's three others—has almost 50 per cent more paved landing area than the other two.

A number of fields have parallel runways, but LaGuardia and Washington National (which rank first and third respectively in fields having most transient traffic) have only four runways apiece and no parallel ones.

Here is a listing of airports, however, that have triple parallel runways:

Turner Field, Albany, Ga.—three sets (with a total of 11 runways).

Cleveland, O., Municipal Airport—one set.

Los Angeles Airport, Mines Field—one set.

Chicago, Ill., Municipal Airport—one set (three sets of duals, for a total of nine runways).

Let's look at Idlewild again, which covers almost eight square miles with its 4,900 acres. It will have only three sets of dual runways when it opens for full operation in 1949. Eventually, however, it is expected to have six sets of dual or parallel runways.

Which is the good flying weather champ? Las Vegas, Nev., with 99.8 per cent contact weather, Williams Field at Chandler, Ariz.; Sky Harbor at Phoenix, Ariz.; and Davis-Monthan at Tucson, Ariz.; all with 99.7 contact weather make Arizona the state champ.

Pittsburgh Airport reports only 74 per cent contact weather.

According to CAA statistics (monthly average for the period December, 1946 through July, 1947), Long Beach Airport has the most aircraft operations per month: 41,273. Cleveland Airport is second with 37,119. Local operations (mostly training), however, accounted for 92 per cent and 79 per cent respectively of the total operations.

Long Beach, the over-all champ, isn't in the running when it comes to transient traffic. Chicago has the most non-local operations—13,333 per month. New York's La Guardia has 12,791, and Washington is third with 11,891. Over 90 per cent of La Guardia's operations were scheduled air carrier, almost 80 per cent of Chicago's and 74 per cent of Washington National's.

Washington National, however, leads in transient Air Force and Navy traffic, having almost six times as much such traffic as both Chicago and La Guardia airports combined.

Within the continental United States there are more airports than there are in Europe (including all of Russia) and South America combined, although these continents have over five times the U.S. population and area. END

Maps Are His Business

(Continued from page 24)

and selling the cases.

But that isn't all.

The Rolaire Engineering Company is a spare-time business. Larry Shapiro's main job is still with United Air Lines. Today he is a captain on the Los Angeles-Denver run.

He attended the University of Southern California, but left school in 1939 when he obtained a commercial license. Two years later he joined United as a co-pilot and has been with the airline since that time. In 1943, he was made captain; and in 1945 was graduated to flying passengers. He has over 6,500 hours.

Airline Captain Shapiro insists he has good reason for spending his spare time in his business rather than on a golf course. He claims the mental agility he develops in working out business or sales problems helps make him a better pilot.

"A pilot has to keep his mental processes sharpened so he can be able to meet any unusual problem in the air," he says. "Mental stagnation may be a contributory cause in some crashes."

Shapiro finds it easy to keep his mind from going stale. He employs half a dozen people in his business. He has done all the engineering work for his map case and he worked out manufacturing processes so the case could be efficiently mass produced. (It retails for $9.95.) He dreamed up a sales program which achieved nationwide distribution for his product.

Now he is seeking even greater tasks. He has developed a new plotting board to help simplify the work of private pilots. He is marketing a plastic tape to use for marking out courses. He has devised a flight log to accompany his Rolaire map case.

Shapiro worked on his map case idea during the war years. But it wasn't until 1945, when he was assigned a co-pilot who had a machine shop, that he was able to get down to serious business on the project. The co-pilot, William P. Moss, helped with initial engineering and the two men set themselves up in partnership.

The partnership struck rough air that same year, however, so Shapiro bought Moss out and since has continued solo.

The pilot-manufacturer says his Rolaire is not new. When a search was being made preparatory to filing for a patent, it was discovered that similar cases had been thought of as early as 1919. The main problem was not manufacture but in compiling the maps.

There are 87 basic sectional maps comprising the whole of the United States. If you fly around Schenectady, N. Y., you probably will have little use for a map case containing sectionals for the territory around Dallas, Tex. It took a good deal of figuring, but now Shapiro has broken all the various flying areas in the United States into 20. He manufactures two types of Rolaire cases which requires that 40 standard map rolls be used.

With all these different maps being cut up to make his cases, Shapiro has become one of the largest users of aerial maps in the country.

The little factory occupies the top floor of a Los Angeles office building. In it, Shapiro has assembled a variety of machines and gadgets which help him turn out his Rolaires on a production line basis.

Cases are made of aluminum, riveted just like the skin of an airplane. The maps are contained on two rollers, each of which has a small crank. Larry is

proud of this crank; he invented it and it represents the patentable portion of his creation.

An area, such as that from San Diego to San Francisco, is rolled in one long strip on the two rollers in the case. The pilot has only to turn the crank to keep an endless picture of his flight track before him.

On sectional maps the case provides a map area 90 miles wide, so there is small danger of straying off course. Some of the strips require the larger world air charts; these show 180 miles of map width.

In addition to the 40 basic regions which Shapiro's maps cover, he makes special strips to the order of any purchaser. He did this recently for a purchaser in Sweden who sent along his own maps with a hand-drawn sketch of the area he wished to cover.

The Bendix flyers had special great circle strips made to their order. Howard Hughes has sufficient strips to cover the entire country. Justin Dart, youthful head of Rexall Drug Co., has a complete set of Rolaire strips for his use also, when he flies his converted Douglas *Dragon*.

Shapiro's eagerness once nearly brought him to grief. It was his closest scrape, in or out of an airplane.

His firm was new, his product practically unknown, when he was commissioned by several Bendix racers to work out special strip maps for them. He hustled into his car at Van Nuys Metropolitan Airport, where he received his orders from the pilots, and began a race of his own over the 20 miles back to his office. It was the afternoon before the start of the race, and the job had to be completed that night.

He hadn't gone far when a wayward truck loomed in front of him. The resulting collision propelled Shapiro through his windshield with sufficient force to give him a nasty cut on the head.

He limped the rest of the way and finished the complex task of cutting and piecing the maps while holding a handkerchief to his head to stem the blood.

That kind of enthusiasm helps make Larry Shapiro a successful businessman and a competent pilot. END

The Navy's New Training Plan

(Continued from page 16)

Ab Initio SNJ flight training, as it's called, was initiated to discover if a satisfactory proportion of average students could be taught to fly in the SNJ safely with less (or no) prior time in the N2S primary trainer. Advantages of this style of training are numerous and obvious. If, from the beginning, it is possible to focus the student's attention on things he will have to cope with later on, such as retractable landing gear, flaps, and manifold pressure gauges, he will become proficient in their use much earlier.

Then, in an emergency during later flying, his reflexes will be correct and he will have no tendency to revert to emergency procedures learned in a more elementary type of flying. In addition, the simplification in maintenance, overhaul, and spare part inventory means considerable increase in efficiency to the training command. The instructor problem, also, is simplified, as the same instructor could be transferred from one part of the training command to another much more readily.

So much for the positive side. To gain these advantages, what must be sacrificed in flight safety and attrition? In instituting a program which will train better pilots faster and cheaper, where do we lose out? The positive answer for the Navy is that nothing is sacrificed in the process. Here is how Navy got the answer.

In March, 1947, two experimental projects began at Navy's huge basic training command base at Corpus Christi, Tex. Both were trial groups assigned to two new basic training syllabi. The old standard syllabus had given the student his first dose of flying in a course called "Basic N2S," which gave him an average of approximately 75 hours in the Boeing Kaydet, dual and solo. Included were all the routine beginning flight exercises, take-offs and landings, slips and "S" turns to a circle, small field procedure, acrobatics, a touch of night flying, and beginning formation work. From this he went on to instrument training, normally flown in the SNJ.

The two new experimental syllabi were substitutions for Basic N2S. The 100 students assigned to "Project X" soon learned they weren't going to spend much time in an open cockpit pushing the N2S around a crowded traffic circle. In fact, they were barely introduced to the *Kaydet*. Only about 20 hours of basic training was flown in *Kaydets*, and from then on it was the SNJ.

The second group (Project Y) had a bigger surprise. Students in this group were destined *never* to know what it's like to fly with two sets of wings instead of one or to experience the doubtful pleasure of listening to the one-way line of chatter pumped through the gossport by an instructor. They were the first group of Naval aviators who climbed into the SNJ on their very first hop.

And, although they didn't realize it at the time, they were better pilots when they completed training. For, translated into flight instructors jargon, their "learned reactions were acquired from the beginning in a modern airplane."

In general, basic training is supposed to teach the student pilot how to fly safely. When he finishes this stage he's supposed to be capable of controlling his plane sufficiently well to begin learning tactics, bombing, gunnery, and other aerial pastimes. The syllabus for Project Y was divided into six stages, each building on material learned in the preceding one, and each aimed at increasing the student's proficiency and confidence.

"Ab Initio SNJ" training started slow, compared with the standard syllabus. Previously, all efforts had been concentrated on getting the student "safe" enough to go around the field once on his first solo. The new syllabus stated flatly that little of lasting good was to be gained by such a per-

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formance. In "Ab Initio" the instructor took it easy and let students get acquainted with the airplane for almost 25 hours before allowing a solo. Even before flight training commenced, a series of 25 lectures covered everything from local squadron doctrine to a blindfold cockpit checkout.

The first flight was practically the same as all first flights—"This is the stick . . . rudders . . . throttle . . . push . . . pull . . . etc." On the third hop, the students got to taxi out and take off. Air work for the first seven periods was mostly gentle flying-S turns, climbing and gliding, stalls with power off and on, wheels and flaps up and down. On the eighth hop came spins and positive recovery instruction. After a review of slow flight and stalls from skidded turns, the 180° power approach to a landing was introduced. Through the 14th flight touch-and-go landings were practiced time after time, with a short review of all air work thrown in each day.

On flight 15, after almost 20 hours, trainees got their first check. It wasn't tough, but was considered enough to put the students on edge and (it was hoped) innoculate them against "checkitis." Time was getting short, so flights 16 and 17 were used by instructors to polish up rough spots uncovered on the practice check. Flight 18 was the instructors' recommendation check. He put the trainees through the works.

Next hop was with a member of the squadron check board. When he was satisfied, he let the trainee take it around once by himself, and then on the next day (the 20th flight) the student soloed for a full hour and a quarter.

That was it—after 22½ hours of dual and two hours with a check pilot, trainees learned enough to fly a 650-h. p. monoplane safely, and to operate satisfactorily all the plane's equipment.

In Project Y, 77 of the 100 students who started soloed. There were no fatal accidents. Washouts at the solo stage constituted only 12 per cent, about the same as with the N2S syllabus. Others were dropped at their own request—mainly to enroll in college, a fact which, coupled with the demobilization of many instructors, handicapped the experiment.

The next of the six stages of training, Stage B, was intended to develop smoothness and precision. For 16 flights, trainees alternated periods of dual and solo. Then they were examined by a squadron check board member on ability to (1) make well-controlled take-offs, (2) fly a series of S-turns without excessive slipping or skidding, (3) maintain good speed control at all times, (4) do flipper turns maintaining constant altitude, (5) hit at least two out of four power approaches to a circle, (6) fly approaches to a small field satisfactorily, and (7) perform a series of satisfactory wingovers—as well as demonstrate proper stall and spin recovery!

Next came 17 flights of fun—C stage and acrobatics. But trainees still had to maintain proficiency in precision work. In the B check they had only to hit two of four circles, and two of four small-field shots. On the C check they had to hit three-fourths of them. So along with loops, slow rolls, Immelmans, and snap-rolls, students worked to achieve over-all proficiency.

Stages D, E and F (formation, instruments, and night flying) required that newly-acquired proficiency for success. Two night hops with the instructor started the stage. Lectures and a basic instrument familiarization flight introduced the trainee to flight "on the gauges." After soloing the SNJ at night, and riding down the runway for the first formation take-off (flown by the instructor, of course), the students got instructions in hand signals, did cross-unders, and fought to keep position (amazingly difficult at first) as the formation made turns and other simple maneuvers. They practiced rendezvous with other planes, and eventually were safe for solo in formation. After six solo periods came the formation check; and then three trainees (chased by an instructor) took off on a cross-country hop. The three hour flight, covering a triangular course with a stop at a strange field for refueling, was practically the swan song in basic training. Instrument course was coming along rapidly, and the student pilots were ready to move on to the next big job—learning to DO things with the airplane.

So successful was the average student with the SNJ that even before completion of the final reports on Project Y it was decided that the N2S would be eliminated from Navy flight training. (At present, the *Kaydet* is used only for inverted spin checkouts.) Due to the absence of "learned reaction" in the N2S, the "Ab Initio" students were found to be much safer for solo in the SNJ than the standard syllabus students who had completed 95 hours of N2S flying before being exposed to the more advanced type.

Of the 77 per cent Project Yoke students who successfully soloed the SNJ, the average time was 24.7 hours of dual before solo. Standard syllabus students with 95 hours of N2S time require 18 hours to solo the same plane. It was concluded that the previously collected time was of little benefit. Washouts were approximately 40 per cent for Projects X, Y—and the standard syllabus. However, in Project Y most washouts occurred early in training, which is desirable. Accident rate on Project Y was less than half that of the N2S syllabus. Both instructors and students praised the new system. Especially important is the fact that Project Y students achieved a better standard of performance in the later instrument stage than did the standard students. This is the first proof that elimination of the primary trainer does not result in improperly trained pilots but actually improves their quality.

Because trainees had never been introduced to the slower, comparatively old-fashioned *Kaydet*, they were able from the beginning to concentrate on the more complicated problem of flying the SNJ—and, as has been pointed out, were not required to "unlearn" methods which applied only to the less-modern planes.

Summarizing the experiment, the Navy says: "The results of this investigation indicate that Primary Training in the SNJ is not only possible but extremely practical. More capable pilots are produced in a shorter period of time, with less hours, less cost, less attrition in the advanced stages and less accidents." END

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Many Reports—Little Action

(Continued from page 13)

against the future of the Republic. The present European policy, even if it were wise, would have to take secondary importance.

Returning to the very able comments of the Congressional Aviation Policy Board, it is pointed out, as FLYING long has contended, that a sound program of military preparedness, is indissolubly linked to the health of the now moribund aircraft industry.

"It also became apparent," says the Report, "that development and installation of a basic system of ultra-modern facilities and controls would expedite high density civil air traffic with safety and certainty under all conditions, assuring a major degree of air defense mobility . . . . National air power is an entity not fundamentally divisible as a weapon, or as a carrier. Materials, organization, and craftsmanship which go to make a great aviation industry are as readily turned to the combat plane as to the transport. Airway facilities which give scheduled dependability to civil air lines also give tactical dependability to military air forces. Airports which serve the burden of national and international traffic also can base tactical or strategic combat squadrons. Transport fleets which serve commerce in peace can tie together tactical and administrative requirements in war."

It is consequently the "conviction of the Congressional Aviation Policy Board that a strong, stable, and modern civil aviation component is essential to airpower for national security."

The Report points out in clear language what all of us have understood for a long time: the need for expediting the development of electronic aids to navigation and landing; for airways traffic control systems, weather reporting, ground facilities, and communication networks essential to both civil and military aviation. It demands the enactment of legislation to establish domestic air parcel post and the carrying of all appropriate first-class mail by air.

The Report further calls on the nation to intensify the present lagging program of aeronautical research and development. It points out that only about one-fifth of the three hundred million dollars [a woefully insufficient sum in itself] appropriated for research and development, is actually devoted to research.

It "notes with deep concern" that the 1948-49 armed services budgets "are in amounts arbitrarily allocated by the Bureau of the Budget" and "do not even approximate the stated requirements of the services."

It observes that the once enormous reservoirs of highly-skilled and expertly-trained flight and ground personnel have disintegrated, and that consequently "we are facing a dangerous situation which threatens effective mobilization and makes planning exceedingly difficult." It tells us dramatically what every competent Government executive should have known five years ago—that "the primary military objective of modern warfare is no longer the armed forces of the enemy," but his war potential and industrial organization; and that if World War III comes it will be ushered in by a "sudden and indiscriminate attack on our cities, our factories, our transportation lines, our communication centers and water supply . . . [and] that there will be no time, as in World War I and World War II, for mobilization." It remarks sagely that the "existence of opposing weapons in quantity and carriers to deliver them, is a restraint upon any nation contemplating attack."

A competent aircraft warning network connected with long-range surveillance radar is demanded, and high priority suggested for the development of nuclear energy propulsion for aircraft. The Report then goes on to note that the same old condition of jealousy and struggle between the services remains; that far from having plans for a gigantic airborne security force, the Joint Chiefs of Staff have not even created a coordinated pattern of strategic planning, despite repeated requests that such a plan be furnished. The investigators remark dryly: "We are at a loss to understand why integrated studies of this type have not been conducted since the end of World War II."

Finally, the Report asks for a standing Joint Congressional Committee on Aviation Policy, which would remain alerted to the changing military requirements existing in this rapidly moving scientific age.

FLYING repeats again: there is no time left for dawdling, for international boondoggling, for moral exhortations between the nations, or for international dope dreams of any kind.

We barely have time enough left to arm, under the technological terms demanded by an airborne, nuclear-energy age, before the consequences of our own national folly catch up with us. END

The Piper Vagabond

(Continued from page 29)

when you consider the fact that you're getting an honest cruising speed of more than 90 m.p.h. at that low consumption, you can see that the *Vagabond* might even be less expensive to take on a trip than an automobile.

There is just one door, on the right-hand side of the fuselage. It has an excellent latch on it, much like the latch on a house door. Both the door and the left side of the cabin have sliding window panels. As you open the door to get in, you can take in all the *Vagabond's* appointments at a glance. You expect it to be an airplane with the bare minimums, and that's what you find. However, the *Vagabond*—despite the fact that you expect it to be "stripped"—has some pleasant surprises.

For example, there is a very effective cabin heater as standard equipment. It works, too; I flew this airplane on a cold winter day. There is an excellent set of toe brakes on the pilot's side. The pedals, incidentally, may look familiar to you; they were bought as surplus from Republic after that company discontinued production of the *Seabee*.

The *Vagabond* has an especially good elevator trim tab. It is operated by a long lever that lies beside the pilot's seat, against the left cabin wall. The lever looks like a flap handle, is simple to operate, and so effective that you can almost fly the airplane with it and the rudder pedals.

There is just one set of controls in the *Vagabond*. The throttle—the conventional push-pull rod—is on the left side of the instrument panel; the pilot operates it with his left hand. The control stick is small and short; I was able to climb into the airplane over it instead of having to squirm around it.

The 12-gallon fuel tank is mounted just behind the engine and the bottom of it projects into the cabin behind the instrument panel. It is fitted with a built-in, float-dial gauge like those used on Model A Fords. However, this tank does not cut

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down seriously on the leg room. The whole cabin, as a matter of fact, is quite roomy and two people can sit side-by-side in comfort. There is a single safety belt for the two occupants—a short-cut, incidentally, that is frowned upon by safety engineers.

The *Vagabond* has excellent maneuverability and visibility on the ground. It taxies easily, although it rides pretty rough on a rough field. This is due largely to the fact that the landing gear is solid and has no shock absorbers or oleo struts. On an ordinary airport the standard balloon tires give satisfactory riding qualities. But make a rough landing in a *Vagabond* and you'll know it.

HERE'S THE DIFFERENCE

	Vagabond[1] (PA-15)	Cub Trainer[2] (PA-11)
CAA type certificate	800	691
Wing span	29 ft. 3⅛ in.	35 ft. 2½ in.
Length	18 ft. 8 in.	22 ft. 4½ in.
Height	6 ft. ½ in.	6 ft. 8 in.
Gross weight (lbs.)	1,100	1,220
Empty weight (lbs.)	620	730
Fuel capacity (gal.)	12	17
Baggage capacity (lbs.)	41	20
Top speed (m.p.h.)	102	100
Cruising speed (m.p.h.)	90	87
Range (miles)	300	328
Service ceiling (feet)	12,500	16,000
Rate of climb (f.p.m.)	510	514
List price (f.a.f.)	$1,990	$2,445

[1]65-h.p. Lycoming engine.
[2]65-h.p. Continental engine.
Source: Piper Aircraft Corporation.

When I flew the *Vagabond* (NC-4125H) it was within 10 pounds of weighing its maximum gross (1,100 pounds). The fuel tanks were full and I had as my passenger George Edgcumbe, Piper distributor for the Chicago area. With that load, and despite the rough, muddy airport, the *Vagabond* was off the ground in six seconds. I made three checks on the rate of climb and got the best rate at an indicated air speed of 70 m.p.h.—480 f.p.m. Piper claims 510 f.p.m. —and it should be remembered that I was flying this airplane for the first time; it would be simple to make a mistake that would cut 30 f.p.m. off its climb.

In level flight I was pleasantly surprised. I expected the *Vagabond* to be somewhat unstable because it is so short-coupled. On the contrary, it turned out to be one of the stablest lightplanes I've flown yet. Once I got the trim set and the throttle at cruising, I was able to fly hands-off as long as I wanted.

I was pleasantly surprised, too, when I stalled the *Vagabond*. There is only a very gentle buffeting on the tail, and neither wing drops, although I used little or no rudder and even had my hand off the stick in several stalls. Indicated air speed in the stall is about 42. With a little power I was able to maintain altitude at that speed. When the plane stalls, the nose drops very little; it seems more to mush than anything else. At no time did the nose drop steeply below the horizon. It was just as gentle in nose-high turns at low speeds.

To check the *Vagabond's* cruising speed I flew an 11-mile course, upwind and downwind. I used cruising r.p.m. (2,350) and flew at 2,300 feet above sea level. My average ground speed worked out to exactly what the indicated air speed showed: 97 m.p.h.

The *Vagabond* is as easy to land as a *Cub*. Just glide at 60, then hold her off and she settles easily onto the field. And the *Vagabond* seems to be quite easy to handle in wind, too; I had no trouble taxiing, landing or taking-off in a wind of about 20 m.p.h.

The "baggage compartment" is actually a large metal shelf behind the seat. You simply pile your luggage on the shelf (maximum: 40 pounds) and tie it down. But there appears to be plenty of room for ordinary luggage.

I could only find two unfavorable points about the *Vagabond* worth mentioning. Most important is the noise—which is due almost entirely to the fact that the engine turns at such high r.p.m. Otherwise, the *Vagabond* is pretty quiet. It has a stainless steel muffler and you can even hear the wind whistling by the doors.

The other point is the fact that there is no overhead visibility at all—which isn't good in a high-winged monoplane. The cabin ceiling is solid.

Otherwise I feel the *Vagabond* is a fine little airplane, and would do nicely as an economical runabout for the average private pilot who must watch his purse. Surely, the maintenance cost to a *Vagabond* owner should be extremely low.

It's a pity this airplane couldn't have been produced sooner. MAX KARANT

The Mail Box

(Continued from page 6)

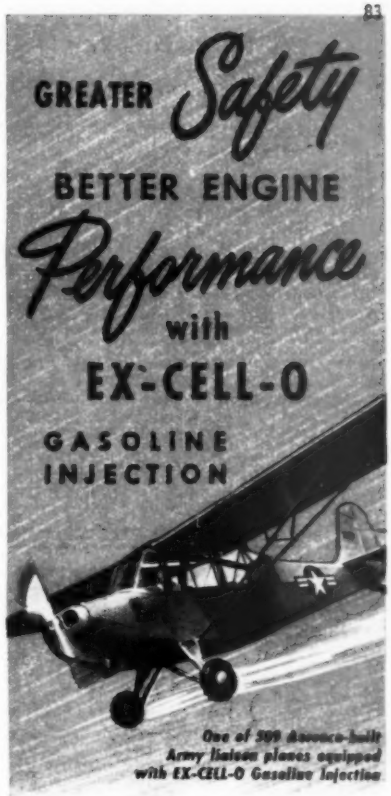
MISQUOTED IN OMNI-RANGE ARTICLE

Your article "What's Wrong with Omni-Range?" (February issue) made several references to my paper "Status of VHF Facilities for Aviation" which appeared in the October, 1947, issue of *Electronics*. Since my statements were misquoted and misinterpreted, I should like to correct the resulting misconceptions.

In my paper I state that ". . . siting requirements . . . are definite. . . ." Your quotation of this statement (page 81) changes the word "definite" to "difficult." The change in meaning and implication is rather obvious and important. It is one thing to have a "definite" requirement, and quite another to have a "difficult" one.

Further I state that an absolute fix can be obtained from two VOR facilities and that if this is to be done automatically, then DME and a computer are required. To use your own words, your "scientist" was indeed "bold" (page 82) when he chose to call this "double talk" and interpret it to mean that the DME-computer combination is a sine qua non for obtaining a fix from two VORs.

It is of course startling to find that it is possible to violate a fundamental law of physics and be able to get away with it—even temporarily, as though nature just has not the time to catch up immediately with all miscreants. If this facility does this, it is certainly a scientific curiosity of great import! That "radio trickery" and "gadgets" (page 81) should be the means of



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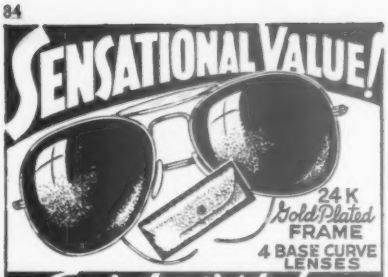

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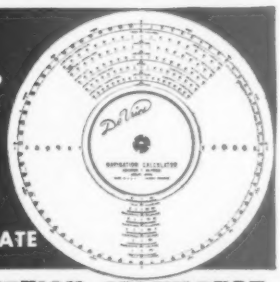

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fooling nature is of great interest, too, since I suspect that these devices have been used more than generously in all of our modern complex engineering achievements—not the least complex being our radar techniques. Are we to anticipate the possibility of a horrible revenge from nature when she catches up with us?

With respect to the "principle" that "under the worst conditions the largest angular error possible in any system is 57° divided by the number of waves that could be laid end to end across the antenna system," (page 80) it is evidently incorrect as I have personally observed cases when this theoretical maximum has been exceeded by far. Of course under very bad conditions indeed —as stipulated by the "principle." The same cases when properly adjusted resulted in errors of negligible magnitude compared to the criterion set forth above. For example, if the phasing and amplitude control of a highly directive array are misadjusted or experience a failure, the directivity is very seriously impaired—to a degree depending on the extent of the maladjustments or failures. What is of interest is not the maximum error under worst conditions, but the error to be expected under normal operating conditions.

For the benefit of your readers it is desired to state that a VOR can be and has been made to provide accuracies to 1°, and that the accuracy of this facility is determined by a number of factors of which antenna directivity is but one. The latter, incidentally, is not "virtually zero" (page 80) but is approximately a cosine function. Radio engineers and technicians are, of course, well qualified to evaluate technical statements such as made in the article in question. But the general flying public not versed in the engineering intricacies of the problem is likely to be grossly misled by the article and it is for this reason I am writing you.

PETER CAPORALE

Chevy Chase, Md.

● A detailed article probing deeper into this whole controversy will appear in the June issue.—ED.

FOR RESCUE WORK

This may be a screwball idea, but it may also save some lives. It has to do with the rescue and finding of survivors of crash landings at sea. The U. S. Navy had a radio transmitter which was dropped from planes into the ocean with a hydrophone attached to check on possible enemy submarines.

The device I have in mind is similar but it would not have to have a hydrophone on it. The frequency of operation would be the international distress frequency which is 500 Kc. Nearby ships would be notified and would be able to direction-find on the small transmitter released by the plane. Searching planes would be able to direction-find on the scene of the crash directly without searching over thousands of square miles of sea.

I realize that a pilot has a lot of things on his mind during a forced landing but he would just have to push a small lever or push a button and release the transmitter and he would be assured of a mark for rescuers to follow. A lot of developmental work would be needed for this. A keyer could be put into it to key off the license number of the crashed plane to help in identification of radio signals.

ARVID C. HENDEN

San Francisco, Calif.

MISPLACED ZERO

Your article "Don't Sell Private Flying Short" by Peter Altman (January issue) contains some very enlightening statistics but I am unable to reconcile the number of planes per 100,000 population with data compiled in this office. In general, the figures shown on page 16 are approximately one-tenth of those computed by this office.

C. L. WILLIS, JR.
Chief, Planning Division
Civil Aeronautics Administration

Fort Worth, Tex.

● See what one carelessly-overlooked zero can do? The heading over the map should have read "Planes per 10,000 population" instead of "Planes per 100,000 population."—ED.

SMALL COFFEE SHOPS

In the interest of private flying, I should like very much to start the ball rolling for an operation of small, clean coffee shops at the smaller air fields.

This was formerly my business and I see no reason why such coffee shops could not be operated on a small scale and profitably even though the trade be limited. I should like to start one out in the southwest area. I believe that the future of private flying will, in part, depend on these necessary facilities.

E. C. A.

Phoenix, Ariz.

● Anyone interested in Reader E. C. A.'s idea may contact him by writing to FLYING. —ED. END

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ONE of the cleanest twin Cessnas in the United States, manufactured in 1944, deluxed job throughout, handrubbed berry red, orange trim with gold penstriped, cabin Fiberglas, soundproofed and upholstered in red leather, all like new. The floor is raised, battery under co-pilot seat, radio in nose, etc. Outside baggage door, extra 30 gallon gas tank, heavy wing, constant speed props with spinners. It is equipped with both heaters and ventilators in the floor of back, as well as front seat. This airplane was modified at Spartan Aero Repair at the cost of $5000. Always hangared, never damaged, in absolute tip-top condition throughout. You would have to see this airplane to fully appreciate it. It is licensed day, night and instrument until September 18, 1948. Modern Welding Co., Box 573, Owensboro, Kentucky.

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1947 CESSNA 140 Deluxe. All accessories; includes G.E. 2-way radio, dome loudspeaker and broadcast band, landing light, metal prop, etc., plus Sherrill compass. Original price, $4000.00; offered now, $2750.00. Privately owned. Just had first hundred hour inspection and is in A-1 condition. Never damaged, always hangared. Now hangared at Bloomington, Indiana. Elwood H. Hillis, 620 Union Bank Building, Kokomo, Indiana.

CESSNA Model T-50. With twin Jacobs Engines recently factory rebuilt. Equipment for cross country flights includes 2-way radio. Has had excellent care. $10,000. Contact Geo. C. Kroening, 3917 N. Prospect Ave., Milwaukee, Wis.

CESSNA Heavy Wing, 6 place, licensed to August, 1948, day, night instrument for hire, spars perfect, 210:00 since engines majored, props overhauled 50:00 back, new tires, tubes, outside baggage door. Finished in orange yellow and Stinson green, two transmitters, two receivers mounted in nose, battery under co-pilot's seat, serial number 6496. One of last built, stored inside since declared surplus. Hood and green glass for simulated instruments. Instruments checked. $10,000 invested, will take $5750 or lighter ship and balance cash. Hempel, Box 41, Lambert Field, St. Louis, Missouri. Terryhill 5-2942, Wabash 677W.

MUST sell Cessna 140, immaculate, two way radio, McCauley prop. 117 total, $2700. Kenneth Beck, Phone 686, Tipton, California.

1946 CESSNA 140. Total time 70 hours. McCauley prop, heater, landing lights. Perfect condition. Price $2300.00. Sid M. Kyle, Pecos, Texas.

TWIN Engine Cessna, late 1942 model, heavy wing, fully recovered, attractively reupholstered, new battery, night, day, 130 hrs. since overhaul. Price $3500. Delivered anywhere in U. S. Arthur Lee Ross, Stratford, Texas. Ph. 39.

1947 CESSNA 140, 97 hours, all instruments, metal propeller, dual brakes, radio, pants, new condition. $2625.00. Salmon, 563 Broad Street, Newark, N.J.

CESSNA 120, 1947. 30 hours Electrical system. Dual brakes. Real buy, make an offer! L. Nickelson. 1124 So. 4th, Springfield, Illinois.

CESSNA, Twin T-50. Being relicensed now, 250 hours on engines since major, control surfaces and wings recovered-constant speed props, $3450. Columbus Airways, Inc., Box 1478, Columbus, Ga.

ERCOUPE

ERCOUPE, 1946, 70 hrs. total time. New engine installed, 10 hrs. on same. $2350. Also, 1947 Ercoupe demonstrator, 10 hrs. $2900. Cannot be told from new. B-C Aircraft, % York Airport, York, Pa.

ERCOUPE, late '46, NC 2438 H. Excellent condition. Company owned, always hangared and properly maintained. Never scratched. 90 hours total. Just relicensed. McCauley metal propeller. Air Radio 52. Price, $2400. Purchasing larger plane. Maryon Hosiery Mill, Inc., Carrollton, Georgia.

ERCOUPE, July, 1946, excellent condition, low time, 2 way Bendix VHF radio, loop, McCauley prop, sensitive altimeter, always hangared, original owner. Trade for new Chev pickup and diff. Wayman Cornelsen, Fairview, Oklahoma.

ERCOUPE, 1946 model, excellent condition, 65 hrs. total, always hangared, privately owned. $2000 or trade for car. H. E. Hershberger, Martinsburg, Pa.

ERCOUPE 1946. Excellent condition, original owner. Less than 100 hours on ship; has 100 hrs. check. Price $2000.00. Always hangared, never in accident. A P. G. Rose, 2616 Bridge St., Philadelphia 37, Pa.

1946, 110 HR. TOTAL time, 3 hr. since 100 hr. check, starter generator, 2-way radio, sensitive altimeter, clock, sunvisor, one owner, always hangared. Make an offer, no trades. Albert Pearson, Sewell, R.F.D., New Jersey.

ERCOUPE. Metal prop, extras. Show or deliver for expenses. Box 452, Algonac, Mich.

ERCOUPE, 1946. Being relicensed now. Total time 280 hours. Bargain at $1495. Columbus Airways, Inc., Box 1478, Columbus, Ga.

ERCOUPE, 1946. Model 415C. Continental C-75-12 engine. Plane used very little. Near-new condition. $1900.00. Contact Geo. C. Kroening, 3917 N. Prospect Ave., Milwaukee, Wis.

'46 ERCOUPE, 170 hrs. Perfect condition, always hangared, never cracked. All bulletins up. Starter, navigation lights, Kollsman direction indicator, turn and bank, radio, sensitive altimeter, sunshade, air temperature gauge. The cleanest ship you'll find. $2150. Everett Holderman, Goshen, Ind.

ERCOUPE, 1946, 62 hrs. total time. Always hangared. All T.O.'s complied with. Flown one hour since annual. Will trade for new Pontiac streamliner sedantte, or sedan. Also, Ford, Chevy or Plymouth. E. W. Cook, Dover, Pa.

FAIRCHILD

PT-26, FULL instruments both cockpits, landing and navigation lights. Licensed day or night, electric starter, hand rubbed finish blue and yellow. Low hours always hangared, engine condition excellent, sacrifice. $1000. Box 1106, Wilmington, N. C. Phone 6082.

1 1946 FAIRCHILD 24 Warner Airplane, 4 place, equipped with Motorola radio, loop, etc. $5,495. Resort Flying Service, Inc., Narrowsburg, New York.

GLOBE

SWIFT 125 h.p., engine and parts for sale. 72 hrs. total. Motorola Avigator Radio, complete, new. $175. H. E. Hershberger, Martinsburg, Pa.

SWIFT 125, deluxe equipment, 167 hours, bulletins complied with, always hangared, exceptional at $2885.00. Rahe O. Hornung. 28 South 7th St., Terre Haute. Ind.

HOWARD

HOWARD. 37 hours since major, recover. Blue, cream trim. 2 receivers. Complete instruments. $3395 buys! Jack Head Flying Service. 212 Ivy St., Rockmart, Ga.

JOHNSON

JOHNSON Rocket: 70 hours total, new condition. 2 band Bendix radio, VHF transmitter, blind flight instruments. Hand rubbed yellow finish. A fast sportman's airplane, with low operational. Cruises at 165 MPH. Will demonstrate. Offers considered. Edward J. Cromer, 142-34 60th Ave., Flushing, N.Y. Flushing 3-2625.

LUSCOMBE

LUSCOMBE 8A. Bought new April '47. Never wrecked, sensitive altimeter, dual brakes. Herman Johnson, McArthur, Calif.

LUSCOMBE model 8-D, 75C. A factory special, this ship has everything. $2100; write for description. H. Sainz, 4601 Lewis Ave., Washington 20, D. C.

1940 LUSCOMBE, no time since major. Engine two years old. New one piece windshield. $1400.00. Obie Bankhead. 3547 S. Alder St., Tacoma 9. Wash.

PIPER

PIPER Cub. 65 h.p. 46 model. Excellent condition. Only 20 hrs. since major overhaul. $995.00 cash, or trade for Swift 125, or car. Luther P. Duncan, Palmyra, Va.

46 CRUISER. Excellent condition. Recently majored. Radio. $1500. Box 572, % Flying.

1 1941 J-3 Cub. Low time since engine major. $650.00. Resort Flying Service, Narrowsburg, N. Y.

100 HP SUPER Cruiser: Starter, radio, heater, Aeromatic prop., perfect. $2800. Want Good J3 Piper. Bernerd Malinoski, 125 Hadley St., South Hadley, Mass.

'47 PIPER Cruiser. 259 Hrs. Excellent condition. New two position prop on ship. $2750. Jack Taggart, Twin Bridges, Mont.

PIPER Club 1948 brand new, list price less 10% discount. JE Engineering Corp., 726 Mission St., So. Pasadena, Calif.

NORTH AMERICAN

NAVION. Less than 200 hrs, hangared, heater, VHF, excellent condition, $6900. Box 575, % Flying.

B25-J AIRPLANE NL licensed, 149 hours total time. Ship now being converted in our Air Line shops to a Plush Executive Airplane. Will accommodate crew and six passengers with baggage. Luxury conveniences including lavatory. Make us your best offer. R. G. Schorling, Continental Air Lines, Inc., Stapleton Airfield, Denver 7, Colo.

1 North American Navion. Purchased new May 1947. Total hours 110. $6300. Resort Flying Service, Inc., Narrowsburg, N. Y.

REPUBLIC

REPUBLIC Seabee, late model, original owner, one pilot, reversible propeller, excellent condition. $4000. David M. Nichols, 102 W. Centre Street, Baltimore 1, Md. Lexington 6855.

SEABEE, #77. 150 hours total, 5 hours since relicense November 1947. Large propeller cylinder and piston. Two way radio and cross country panel. $4800.00. Acadia Aviation, Inc., P.O. Box 57, Ellsworth, Maine.

SEABEE: Low hours. Like new condition. Also new spline shaft 145 Warner Engine. Write or wire best reasonable offer. Machesney Airport, Rockford, Ill.

LATE 1946 Seabee: Like new, fully equipped, radio. $3495 cash. Roger P. Dube, 55 Cedar Street, Lewiston, Maine. Tel. 254.

SEABEE: Serial 530 private owner, always hangared, never in salt water. Reconditioned propeller, Kollsman compass and rate of climb, 3 band radio, all bulletins complied with, excellent condition. $5000. C. T. DePuy, 634 Lexington Ave., Rochester, N. Y.

STINSON

L-5: GOOD condition, modified for cargo or three people. Will trade for PA-11, sheep or cattle. Harold Woosley, Buffalo, Wyo.

STINSON 10A. Licensed till Nov. 1948. Have two-way radio. Blind flight instruments. Grimes landing lights in each wing, starter, generator, flares. Tops of wings have just been recovered and whole ship repainted. Engine has 250 hrs. since major. $1750. Ted Kyowski, East Moriches, Long Island, New York.

1947 STINSON 150, red, 84 hours, privately owned, new condition, best offer around $4500. K. C. Thomas, % Armco, 3202 West Sample Street, South Bend, Indiana.

1947 VOYAGER 150, 310 hours, Aeromatic, flares, clock, all instruments, privately owned always hangared, never damaged. Owner buying faster plane. $4250. Somerset Air Service, Inc., Bedminster, N. J.,

STINSON 150, 1946, complete sensitive instruments, 250 hours A & E, hangared Teterboro, New Jersey. Henry Herbert, 485 Fifth Ave., New York, N. Y.

VULTEE

ANNOUNCING BT-13A policy: We will not be undersold. 65 to choose from: 20 licensed gleaming beauties with zero time since license, cleanest you'll find; 45 unlicensed. Also all parts. We have your best buy. Gaare Supply, Box 1377, Vernon, Texas. Phone 110-W.

UNLICENSED BT 13A. $350. For information write P. H. Norman, Route 2, Greensboro, N. C.

TAYLORCRAFT

1946 DELUXE Taylorcraft, low time, hangared, never damaged, Beech Variable prop, wing tanks, receiver, excellent condition. Reasonable, Box 1347, High Point, N. C.

WACO

WACO UPF: 2-place open, 220 Continental, licensed to Sept., 1948, always hangared, good buy at $1200. Box 92, Crawfordsville, Ind.

WACO Model AGC-8. Licensed five place, day and night instrument. New Bendix two-way radio, new factory installed Jacobs 330 HP engine. Total hours, 174. Black and orange hand rubbed finish. Ship in excellent condition and clean throughout. Priced to sell. Not flown since relicensed. Bosworth Drilling Company, Box 3387, phone 5551, Odessa, Texas.

MISCELLANEOUS

HUDSON: 1946 coach, radio, heater, wonderful condition. PT-26: 75 hours on engine, all instruments, both cockpits, being relicensed, wonderful condition. Both for $3500. S. B. Nuzie, Box 88, Mattoon, Ill.

USED Airplanes. Selling-out bargains. Extraordinary buys! Licensed. Privately owned. National Directory, 25c Aero-Traders, FM, Adams, Mass.

DeHAVILLAND Mosquito bomber, brand new, just test-flown, always hangared. 3,000 miles range, 400 miles top speed, VHF. Available in Canada, delivery anywhere. JL Roma 17 Mexico DF.

SAVE $100.00 to $5000.00 on an airplane. Largest stock of used and new planes in the West. All makes. We trade or pay cash for cars or planes. Airworthy parachutes as low as $24.50. Chest packs. Send for our free list. Dealers setup for operators. Vest Aircraft Co., 4610 Dahlia, Denver, Colo

CERTIFIED Used Planes. Write for our detailed descriptions and prices covering several high grade two and four place used airplanes. Ready for immediate delivery. Arkansas Aviation Service, Grider Field, Pine Bluff, Arkansas. Stinson Distributors.

AIRPLANES WANTED

NEW four passenger plane by Cedar Point Enterprises. Will trade concession called Babaloo, a modern fun house. Receipts of $2,185.00 in summer of 1946 when constructed; and, $1,118.00 in summer of 1947. Gross can be greatly increased by direct management. Located in Cedar Point Amusement Park, Sandusky, Ohio. Valued at $9,000.00. Box 579, % Flying.

CURTISS AT-9. State condition, hours, equipment, price. Also crackup wanted for parts. Cash for technical manual on this ship. G. Vanech, Alpine St., Stamford, Conn.

1939 OR 40 AERONCA Chief. Fabric condition not important if priced right. C. C. Byron, 5136 Springfield Pike, Dayton 3, Ohio.

1947 BELLANCA CruisAir, good condition, reasonably priced, inspectable within 600 miles of New York City. Write William Bertsche, 233 Broadway, New York 7, N. Y.

PARTS AND ACCESSORIES

CONTINENTAL R-670 engines, newly overhauled, with carburetors, magnetos, $295. Quantity dealer discounts. C. L. Moore, 545 N. Madison Ave., Pasadena 4, Calif.

TIRES of all sizes! Huge supply of new 33", 27", 29", 12.50, 27x12, 14.50, 6.50x10, 8.50x10, and a few assorted used ones in odd sizes. Southwestern Aero Exchange, 7744 E. Apache, Tulsa, Okla. Phone 6-2461.

ATTENTION! Light plane owners, here's what you have been waiting for. Have your tires retreaded. Save money, work guaranteed, reasonable rates, fast service. We specialize in 8.00x4 and 6.00x6. Write for prices, disc. to dealers. Kee-Con Company, Inc., Funkstown, Md.

NEW 6-Ply 10:00 Firestone tail wheel tires for PT's, AT's, BT's, Stearman, etc., complete with cactus proof tube, $7.00 set. Tubes only $1.25 each or $12.00 doz. BG SU455 spark plugs same as C26, 75c each. Galveston Aviation Service, Box 851, Galveston, Texas.

BEECHCRAFT! Parts! Beechcraft! Just received a carload of new and used twin-engine Beechcraft AT-11, AT-7, C-45, C-10-S, some D-18-S parts. Try us first and save time and money. We've got it. Southwestern Aero Exchange, 7744 E. Apache, Tulsa, Okla. Phone 6-2461.

STAGGER Wing Beech Parts! We have just received a large supply of new and used parts for C, D, E, & F-17 parts. Don't waste time hunting parts. We have them already. Southwestern Aero Exchange, 7744 E. Apache, Tulsa, Okla. Phone 6-2461.

HOWARD! Howard! Howard! Just received two carloads of new and used Howard parts and can fill your order immediately. Southwestern Aero Exchange, 7744 E. Apache, Tulsa, Okla. Phone 6-2461.

STEARMAN! Boeing! Stearman! Our stock of Stearman parts has just been swelled by several carloads. Helmet and Goggle days are here. Get that PT in the air with our parts. Southwestern Aero Exchange, 7744 E. Apache, Tulsa, Okla. Phone 6-2461.

TWIN-CESSNA! UC-78 & T-50 parts! New and used parts by the acres. Whatever you need to put that Gingham Bomber in Tip-top shape. Southwestern Aero Exchange, 7744 E. Apache, Tulsa, Okla. Phone 6-2461.

NEW Dry-Charged AN 3150, AN 3151, NAF 1062-17, batteries with quick disconnect, in original boxes ready for shipment. Southwestern Aero Exchange, 7744 E. Apache, Tulsa, Okla. Phone 6-2461.

R-1820-60 WRIGHT engines, new, in boxes. $650.00 each. Southwestern Aero Exchange, 7744 E. Apache, Tulsa, Okla. Phone 6-2461.

TWO R-985-AN-3 Pratt & Whitney engines with no time since Spartan Aero Repair major overhaul, drilled for Hydromatic. 237 total hours on one, 600 total on other. $1750 each f.o.b. Southwestern Aero Exchange, 7744 E. Apache, Tulsa, Okla. Phone 6-2461.

PRATT & Whitney R-985-AN used parts, all magnafluxed and checked by Spartan Aero Repair. Southwestern Aero Exchange, 7744 E. Apache, Tulsa, Okla. Phone 6-2461.

ASSORTED sizes of oil and fuel hoses for all engines. 24-volt Fluorescent cockpit lights. Flux-gate compass amplifiers and caging drives. Complete Magnesyn compasses. 15991-A Mall armatures. Ignition harness and high tension leads. Ahrens controls. CO-2 2½ lb. fire bottles. Ansul-Dugas dry chemical 4 lb. Fire Extinguishers. Piper and Taylorcraft seat cushions. Cessna and Cub J-5 formed windshields. And a thousand other items. All new or like new and so-o-o-o cheap. Southwestern Aero Exchange, 7744 E. Apache, Tulsa, Okla. Phone 6-2461.

FLIGHTEX "A" sewn fuselage covers for Cubs, Aeroncas, Taylorcrafts, Interstates, Porterfields, $27.50. Intermediate fabric lower. Also Cessna, Fairchild, Ryans, Wacos, Stinsons, quoted. Dope, $1.75; thinner, $1.50, pigmented dope, $3.75 gallon. Ostergaard Aircraft, 4627 Armitage, Chicago, Ill.

AIRCRAFT Phone Transmitter, Maguire ART-1-3105 Kcs. crystal controlled, 8 watts output, total weight including built-in power supply only 10¾ pounds, operates on 12 volts DC. $69.00 each FOB. Globe Products Corp., P. O. Box 7, Bridgeport, Conn.

CONSTANT Speed 2-B-20 and 2-D-30 propellors. -15 & -16 blades. One Curtis-Reed metal prop for Warner 145. PT-19 large hub, 2-D-30 with -12 blades for BT-13. Large number of hard-to-get light plane props. Most of these are new or zero time since overhaul. Southwestern Aero Exchange, 7744 E. Apache, Tulsa, Okla. Phone 6-2461.

FOR Sale: Late type Wright used engine cylinders for J540-760 or 970. Less than .003 taper, $15.00 each or 7 for $80.00. Saunders Motor Company, Longview, Wash.

1 LYCOMING 65 H.P. engine not installed in aircraft. No time since major. $195. Resort Flying Service, Inc., Narrowsburg, N. Y.

GE ASIB TRANSMITTER receiver, Factory re-conditioned. Personal guarantee. $175. Clement Pease, 460 Beacon St., Boston, Mass.

AVIATION EQUIPMENT

COMPUTERS, Dalton Model G, which straps to the leg, leaving one hand free, (formerly sold for $50.00) now only $7.50; Rolaire deluxe map cases for safe, easy pilotage, $14.95; Model G Rolaire, $9.95; AAF-type A-2 computer, $2.00; Weems plotter for measuring courses, speeds, distances, $2.00; New Model C American Airlines computer in leather case, with instructions, $5.00; E-6B Army computer, most widely-used computer in aviation, $10.00 (with leather case & instructions); and from our large war surplus stock; Army D-12 aperiodic compasses for aircraft, airports and marine vessels, $12.50; astro-compasses, with instructions, now only $8.75; Longines pocket compasses for sport or work, new, $1.20; Dietzgen 6-inch protractors, 20c; Elgin pocket stopwatches, like new, $12.75; Bausch & Lomb sextants, $37.50; like new F-8 aerial cameras, a "best buy of the month" at $175.00; pilots' briefcases, $6.50. Inquiries about new dealer agencies welcomed. Pan American Navigation Service, Dept. F-1, 12021 Ventura Blvd., N. Hollywood, Calif.

VEST BT Standard twin seat kit, seats upholstered, complete with instructions, only 4 hours to install, $98.50. Convert to dual controls two minutes, money back guarantee. Vest Aircraft Co., 4600 Dahlia, Denver, Colo.

NEW A-2 type flight jackets made of the finest horsehide or goatskin. Zippered front, knit cuffs and waistband with roomy snap pockets. Regular sizes priced at $18.75. For big men, sizes 48 and 50 priced at $19.75. R.A.F. Manufacturing Company, 6 E. Lake St., Chicago 1, Illinois. Buy direct and save.

NEW B-15 type jackets made of durable O.D. cloth. Alpaca lined, knit cuffs and waistband with genuine Mouton fur collar. All sizes. Now at only $11.95. R.A.F. Manufacturing Company, 6 E. Lake St., Chicago 1, Illinois. Buy direct and save.

GENUINE Navy Intermediate Flight Jacket. New, dark brown goatskin leather, mouton fur collar, bi-swing back, celanese lined, zippered, elastic-knit waistband and cuffs, size 34-48, $35.00. A2 Flight Jacket. New, Army type, select dark brown horsehide leather, cloth lined, zippered, elastic-knit waistband and cuffs, size 34 to 44, $18.75. ANJ-Navy Winter Flight Jacket. Genuine, new, dark brown leather sheepskin lined, large shearling collar, zippered, two large patch pockets. Sizes 38-44 & 46 only, $29.50. Pilot Vests. Army type, new, leather, sheepskin lined, $7.00. Flying Equipment Co., 1641-5 W. Wolfram St., Dept. F, Chicago 13, Ill.

PILOTS License Case. P1 Genuine Morocco leather, six windows, $2.50. P2, Sheepskin leather, black, $1.25. Wallets, Genuine brown Calf or tan Saddle leather, the finest, $4.50. To above items add 20% excise tax. Aircraft Inspection Flashlight. With long adjustable nozzle, $1.50. Gold Stamping: Names stamped on leather strip. One line, 65c. Two lines, $1.00. (No C.O.D.'s). Many other items. Flying Equipment Co., 1641-5 W. Wolfram St., Dept. F., Chicago 13, Illinois.

HELMETS. A-11, AAF, leather with sponge rubber ear cups, $3.45. ANH-15, AAF light weight tan gabardine with sponge rubber earcups, $1.00. Sun Dodger Flying Cap, khaki or olive drab twill, long visor, $1.15. B2 Pilot Cap. Army type, leather, sheepskin lined, long visor, ear laps, $3.75. State head size. Flying Equipment Co., 1641-5 W. Wolfram St., Dept. F, Chicago 13, Illinois.

BATTERIES and Tires: New, for all types of Aircraft. Also tubes. Send for free list of low prices. Flying Equipment Co., 1641-5 W. Wolfram St., Dept. F, Chicago 13, Illinois.

USED Folmar K-10 Aerial Camera. Takes 5x7 pictures. $75.00. Resort Flying Service, Narrowsburg, New York.

FLYING Suits. New, L1 olive drab wool gabardine, 9 zippers, medium size, $12.00. New, K1 tan byrd cloth, lightweight, 9 zippers, small, medium and large, $10.00. Mae West Life Jackets, Less CO_2 Cartridge, $4.00. Cartridges 25c each. Pilot Boots, New, dark brown leather, shearling lined. Army or Navy type, $16.95. Scarfs white Nylon, 66"x18", $1.95. Gloves, B3A, AAF, flying gloves, new, dark brown unlined genuine kidskin leather with take-up elastic inside wrist, all sizes, $2.95. Same glove in Buckskin, size 8 only, $3.95. Navy Pilot Gauntlet, dark brown goatskin leather, baby lamb lined, one finger mitten type, small, medium and large, new, $7.95. G.I. Gloves, Army, khaki wool, leather palm, all size $1.95. Regular wool knit glove, warm and neat, maroon or brown, only, 95c. State size. Flying Equipment Co., 1641-5 W. Wolfram St., Dept. F, Chicago 13, Ill.

NOT surplus, Switlik back pack parachutes, guaranteed in perfect condition $39.95. Repacked before shipment, $43.95. Ozark Airways, Marshall, Missouri.

NEW Motorola Airboy radios, complete headset, aerial, batteries, $45.00 value for $29.95. Less headsets, $27.45. Ozark Airways, Marshall, Missouri.

JUST released for sale. Dalton E-6-B computers, strap on leg when flying, in metal container, turn dial with knob, instructions furnished, will liquidate for $8.00. British Surplus Commodities, 5625 N. Spaulding Ave., Chicago 45, Ill.

A-2 TYPE flight jackets with genuine Mouton fur collar. Body make of the finest front quarter horsehide. All sizes. Priced at $19.75. R.A.F. Manufacturing Company, 6 E. Lake St., Chicago 1, Illinois. Buy direct and save

NEW B-3 or ANJ-4 sheepskin lined fur jackets reinforced with horsehide. In all sizes $22.50 B-2 sheepskin cap in all sizes, $3.75 R.A.F. Manufacturing Company, 6 E. Lake St., Chicago 1, Illinois Buy direct and save.

SEXTANTS for Land, Sea and Air used Fairchild Bubble type Model A10s. Complete with case $8.75. Model A10As, $12.75. New Link model A12s, $30.00. C. W. Flying Service, Municipal Airport, Baltimore 22, Md.

AERIAL Photographic Equipment: We have largest stock in the world. Cameras include K3B's, K17's, K18's, K20's, D15's, K21's, K17B's, 35 mm. motion picture cameras. An excellent selection of vertical view finders, intravolometers, gun cameras, ringmounts, viewers, projectors, stereoscopes, portable dryers, all types of contact printers, at prices a fraction of wholesale. Let us know your requirements. The Coogan Co., 8440 Sunset, Hollywood 46, Calif.

TIE-DOWN Rings for Cessnas, Stinsons, Pipers, Taylorcrafts, $1.19 pair; E-Z Drain Gascolator Bowls 2" or 2⅛". C.A.A. approved, $3.75; Screw-in Mooring Stakes, 16" long, three in plastic bag, $5.98; polished Propeller Spinners for engines to 80 h.p., $3.50, complete. Available better airports. Consolidair, Inc., Alliance, Ohio.

U. S. Surplus clothing, general merchandise. Amazing bargains now available for Men, Women. Free catalog. New York Clothing Co., Dept. F, 2079 Second Ave., New York 29, N. Y.

ALL wool gabardine L-1 flying suit, nine zippered pockets, in all sizes. While they last—$7.95 Your last chance to buy this garment at this low price. R.A.F. Manufacturing Company, 6 East Lake St., Chicago 1, Illinois. Buy direct and save

NEW A-2 type flight jackets in genuine goatskin. Knit cuffs and waistband, zippered front. Priced at $18.75. Names engraved in gold on leather strip with wings for only 75c. R.A.F. Manufacturing Company, 6 East Lake St., Chicago 1, Illinois. Buy direct and save.

VEST AT-6 Chum Seat kit. The first and only practical seat. Upholstered seats complete with instructions, new low price, $179.50. Vest Aircraft Co., 4600 Dahlia, Denver, Colo.

NEW Navy Surplus leather flight helmet NAF 1092 chamois lined, $3.00. New N2 Polaroid pilot goggles with extra lenses, $3.00. New Army A10 leather flight glove, lined, $3.00. New Army B-3-A kid leather flight gloves, $3.50. Pilot Map Case with your name in gold letters, $2.00. Full line of Army and Navy jackets, etc. Send 25c for catalog of over 100 amazing values. Join our 10% club, $1.00. Members entitled to 10% discount on all items. Postage prepaid on cash orders. Satisfaction guaranteed. Pollock's Gov't Surplus, 6077 Van Nuys Blvd., Van Nuys, Calif.

STORM Worries? You need the tie-down stake that realy holds. Made of ¾" solid steel rod 5 ft. long with 4" sharp edge screw flange near pointed lower end and with closed loop on top. Easy to install or remove. Place pipe through loop and simply screw in or out of ground. down stake that really holds. Made of Also in 6 ft. length with 6" flange. Your choice. Supply limited. Order now while they last. New, $3.00 each. Used, in good condition, $1.75 each. Payment with order. Gaare Supply, Box 1377, Vernon, Texas. Phone 110-W.

BOOKS

MECHANICS' Examinations for 1948 can be found in "A. & E. Mechanics' Manual" (Zweng). New revised edition contains questions & answers not available elsewhere. 254 pages, $3.00, postpaid or C.O.D. Pan American Navigation Service, Dept F-1, 12021 Ventura Blvd., N. Hollywood, Calif.

FLIGHT Engineers: Charles A. Zweng's new "Flight Engineers Manual" contains typical examination questions and answers for flight engineer rating. $4.00, postpaid or C.O.D. Pan American Navigation Service, Dept. F-1, 12021 Ventura Blvd., N. Hollywood, Calif.

FLIGHT Instructor, by Charles A. Zweng, for C.A.A. examiners and applicants for flight instructor rating. Only book available which shows grading methods for flight maneuvers. Contains typical multiple-choice examination questions and answers. $3.00, postpaid or C.O.D. Pan American Navigation Service, Dept. F-1 12021 Ventura Blvd., N. Hollywood, Calif

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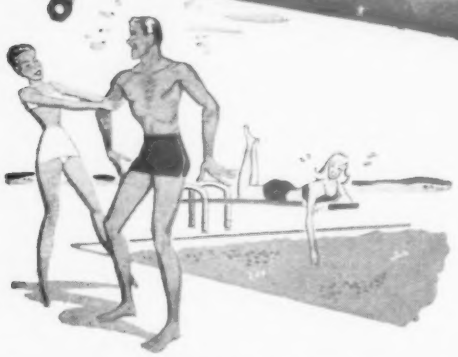

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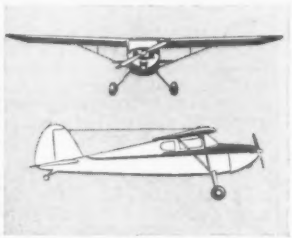

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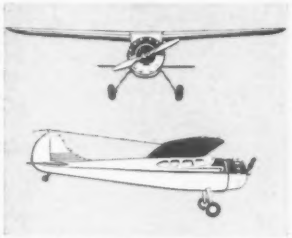

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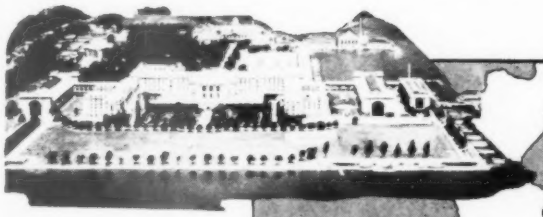

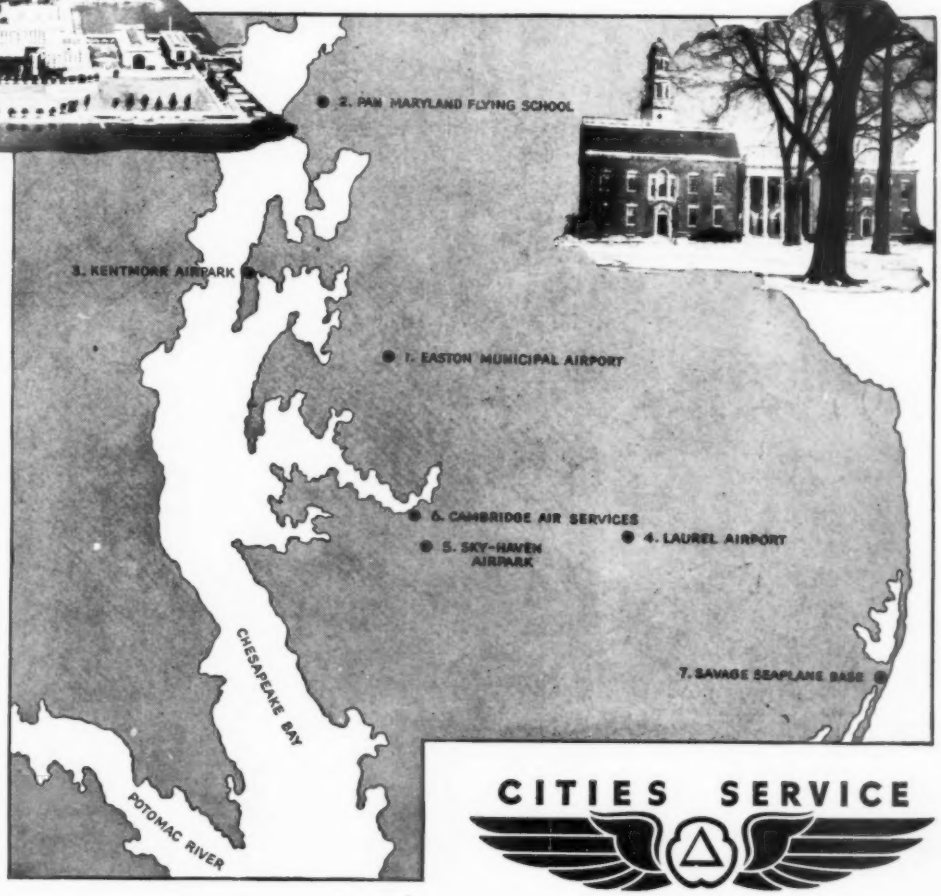

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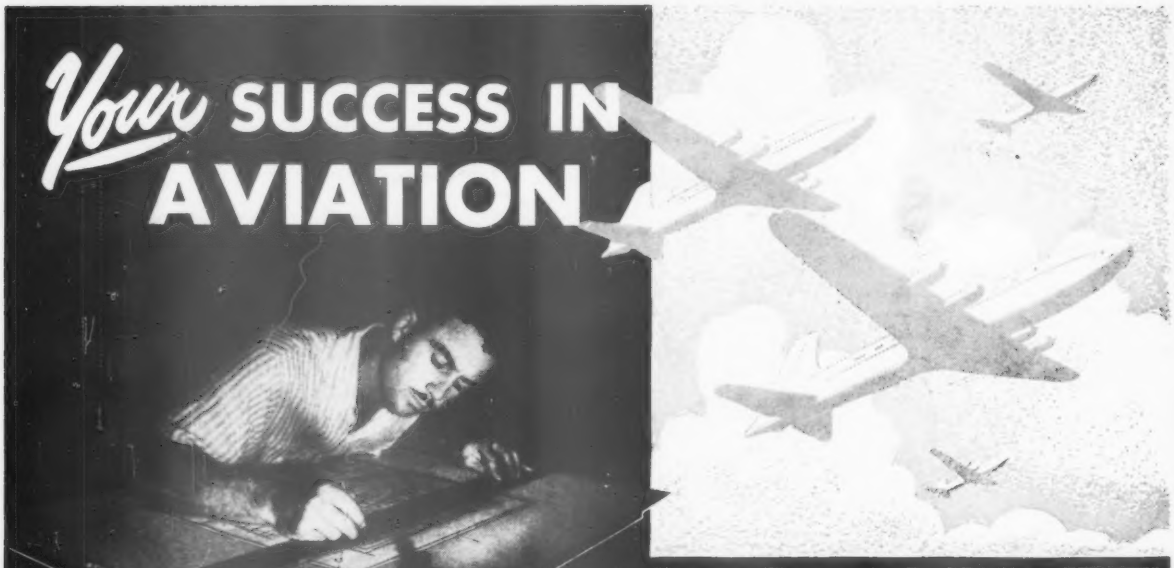

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